RCH 12, 1942

The IRON AGE

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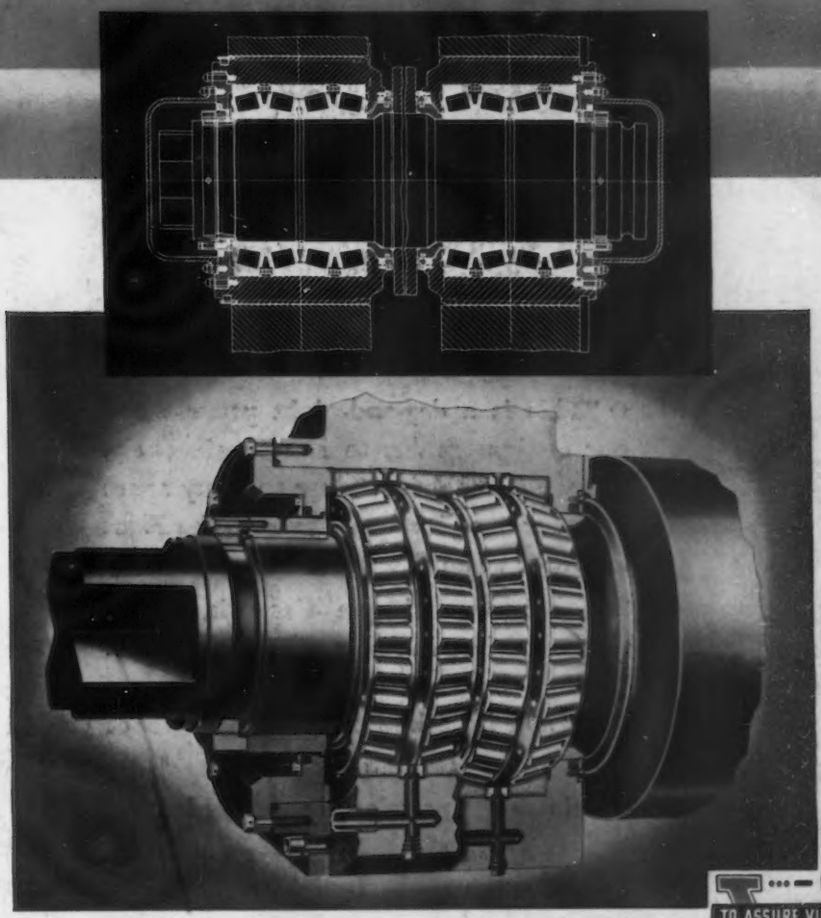

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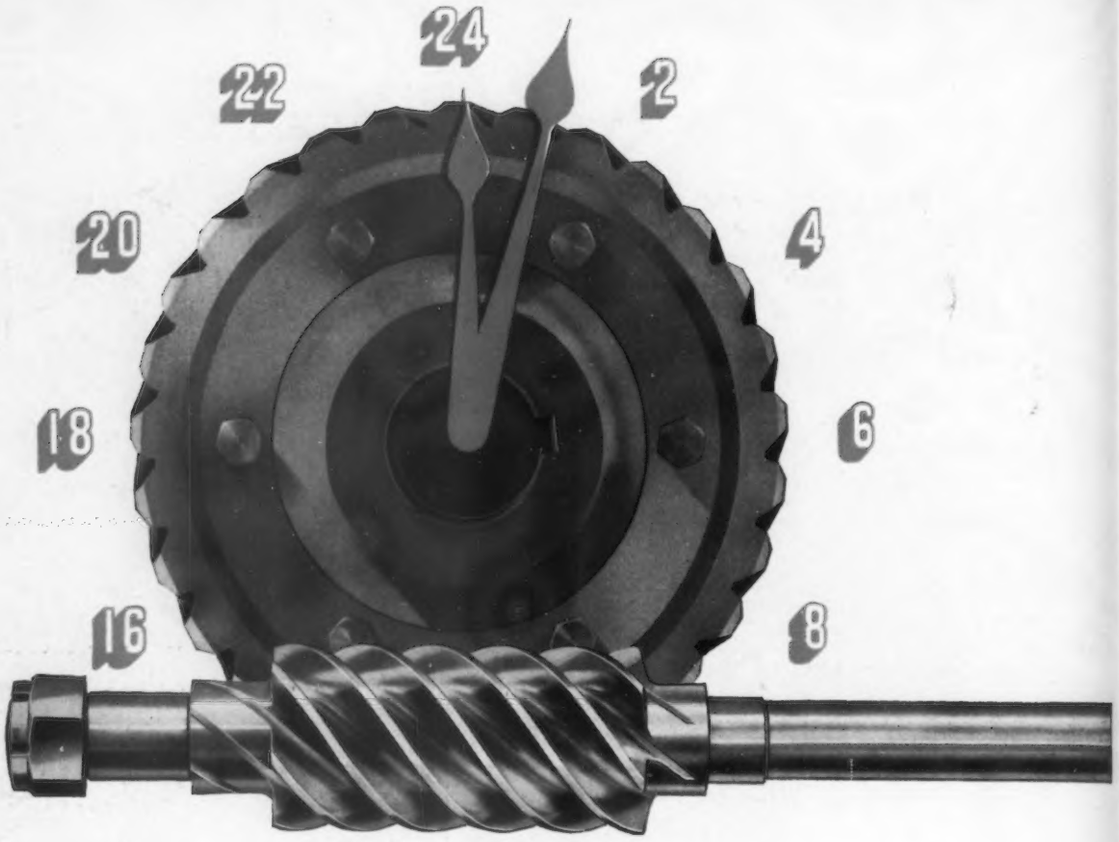

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The two-fold Ryerson function is to supply steel where needed, without delay—and to aid in the most effective, intelligent use of that steel in every way that experience and skill can suggest.

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THE IRON AGE

MARCH 12, 1942

ESTABLISHED 1855

Labor Restrictions on War Output

AN airplane or a tank or a gun of any caliber cannot do much war business unless it has ammunition. And Uncle Sam has taken care of that end of it by placing orders with American manufacturers for plenty of shells and bombs.

No doubt they will be good shells and bombs when we get them and God knows that we need them.

Uncle Sam has done his part by designing, specifying and placing the orders. So now it is up to industry to turn these things out in the greatest possible number and in the shortest possible time.

There will not be any lack of materials; priorities take care of that. There will be no lack of efficient shell making equipment; our machine tool industry has seen and is seeing to that. So that brings the responsibility down to the management and the labor in the plants that have shell contracts.

It is inconceivable to me, and I think it will be to you too, that the American people, with sons, brothers and husbands at war, would or will tolerate for a moment, any artificial and deliberate "slow down" in shell production by which machines in these plants capable of turning out shells are kept idle, or those at work are permitted to perform far below their rated and tested output capacity.

If machines that might be used are idle, the responsibility is that of management. If they are slowed down because of union restriction on daily or hourly output, the responsibility rests upon labor.

Last week, in traveling as I do about the country, I heard of an instance of this sort that deserves attention—and action. It came from an unimpeachable authority whose name I am withholding because of the possibility of political or other reprisals.

Machine tool builders had provided a certain manufacturer with equipment that had been demonstrated to be capable of turning out, let's say, 24 shells of "X" caliber every 24 hours. Management in the contractor's plant was anxious to run this equipment to capacity on a 24-hour basis and had provided enough men to operate at that scale. But previous equipment, as operated in that plant, had turned out but two similar shells per day. And the union insisted that the new equipment should operate on the same basis.

Now I do not for a moment think that this attitude is typical of labor in this country. But I do think that there is enough of it so that if searched out and corrected, there would be little difficulty in giving Donald Nelson the modest 25 per cent increase in production for which he asks.

I think that there should be a confidential bureau established by government to which both management and labor could refer such cases for investigation, with assurance of anonymity to prevent plants being struck or men being fired.

J. H. Van Deventer

There is Magic in "Scrap"

Help Overcome the Critical Shortage!

Are you listening to America's call for scrap—scrap, the magic metal that can be melted and refined into steels for the fighting forces of America and her Allies?

Charging scrap into furnaces is not a new steelmaking method. It has been practiced for years, conserving millions of tons of valuable iron ore resources. Last year scrap collecting facilities made available 25,000,000 tons to help maintain the output of America's steel plants. The need is so urgent, however, that even greater effort must be applied so that all steelmaking furnaces can operate at full capacity.

Make a search for scrap throughout your plant. You may find discarded machinery, a rusty shaft, a broken rail, a twisted beam, an old boiler, an obsolete crane, an unused switch track, a steel trussed building too costly to repair and use. What about the "bone pile," where odds and ends have been rusting for years?

Possibly you can find only a few pieces of scrap, weighing only a fraction of a ton. **Start them on the way to a steel mill!** Your local scrap dealer, gathering a piece of scrap here, and one there, will soon fill a car. Carloads from other dealers will grow into a trainload. Trainloads arriving at mills will assure steel output at capacity.

Remember that 50 pounds of steel means another 105 mm. shell; 25 tons another tank; and, 25,000 tons will place a new cruiser and several cargo ships under the American flag.

Time and materials are precious to our men on the fighting fronts. Do not handicap them—answer America's call today—send your scrap to be refined into useful steel.

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Magnafluxing Procedures

. . . Results of an investigation into the efficacy of the various techniques which can be employed with this non-destructive method of testing for surface and subsurface cracks is reported in this, the first section of a two-part article.

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By F. B. DOANE and M. MAGES
Magnaflux Corp., Chicago

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INCREASED production of warplanes and ordnance and the progressive severity of demands placed upon the materials going into these war products have focused attention on magnaflux as an important means of making non-destructive tests of these metals. These tests are being applied currently at various stages of manufacture and are also being used during periodic overhauls while the machines are in actual service.

With the increased use of this non-destructive method of testing, have come demands for equipment suited to production inspection and a need for a clearer understanding of how the tests should be applied.

To aid in filling this need for a clear understanding of magnaflux testing, the investigation reported in this article was undertaken to determine what should govern a tester's choice of method and inspection medium for locating surface and subsurface defects.

It is convenient to classify all defects discoverable by the magnaflux method on the basis of whether they are surface or sub-surface in character. Under the first category are included, among others, quenching cracks, forging laps, grinding checks, surface seams and fatigue cracks. The first four named are introduced in manufacture, but fatigue cracks are produced only in service. They are, therefore, the main consideration of the overhaul inspector.

The second category, sub-surface defects, includes sub-surface seams, sub-surface defects in welds such as slag pockets, and shrinkage cavities and porosity in castings, all of which are manifestly produced during manufacture.

In considering the technique of the inspection procedure, the magnaflux operation is performed in two steps: (1) The part is magnetized, and (2) the inspection medium is applied. These two operations can be performed successively or simultaneously.

For convenience, each of the above steps may be further subdivided into two headings according to the kind of magnetizing current employed. All magnetization procedures commonly used at present depend on the use of either a.c. or d.c. for the magnetizing operation.

Two Inspection Mediums

The inspection medium, consisting of finely divided ferromagnetic material, can also be applied in either of two general ways—as a dry powder*, or as a suspension in a liquid suspensoid such as a light oil distillate. The first of these procedures is called the dry method, the second the wet method.

The operator, therefore, has the choice of using either a.c. or d.c. for magnetization, and the choice of using either the dry or wet method in applying the inspection medium. There is also a third choice as to whether to magnetize the part and apply the inspection medium afterwards, performing the two operations successively and relying on the magnetic retentivity of the specimen for the indication (called the residual method), or to use the continuous method in which the inspection medium is applied simultaneously with the current flow or shot.

The current may flow for an extremely brief interval of time, as brief as 0.00001 sec. in the case of flash magnetization, but during that time the ferromagnetic material is present in the vicinity of the defect and is attracted by the leakage field which the defect produces. The requirements for the so-called continuous method are therefore fulfilled.

The part of this investigation completed to date covers a comparison of the results obtained with a.c., d.c. and rectified a.c. magnetizing currents in locating surface and sub-surface defects, and a comparison of the relative value of the wet and dry methods for locating these defects. It does not cover compari-

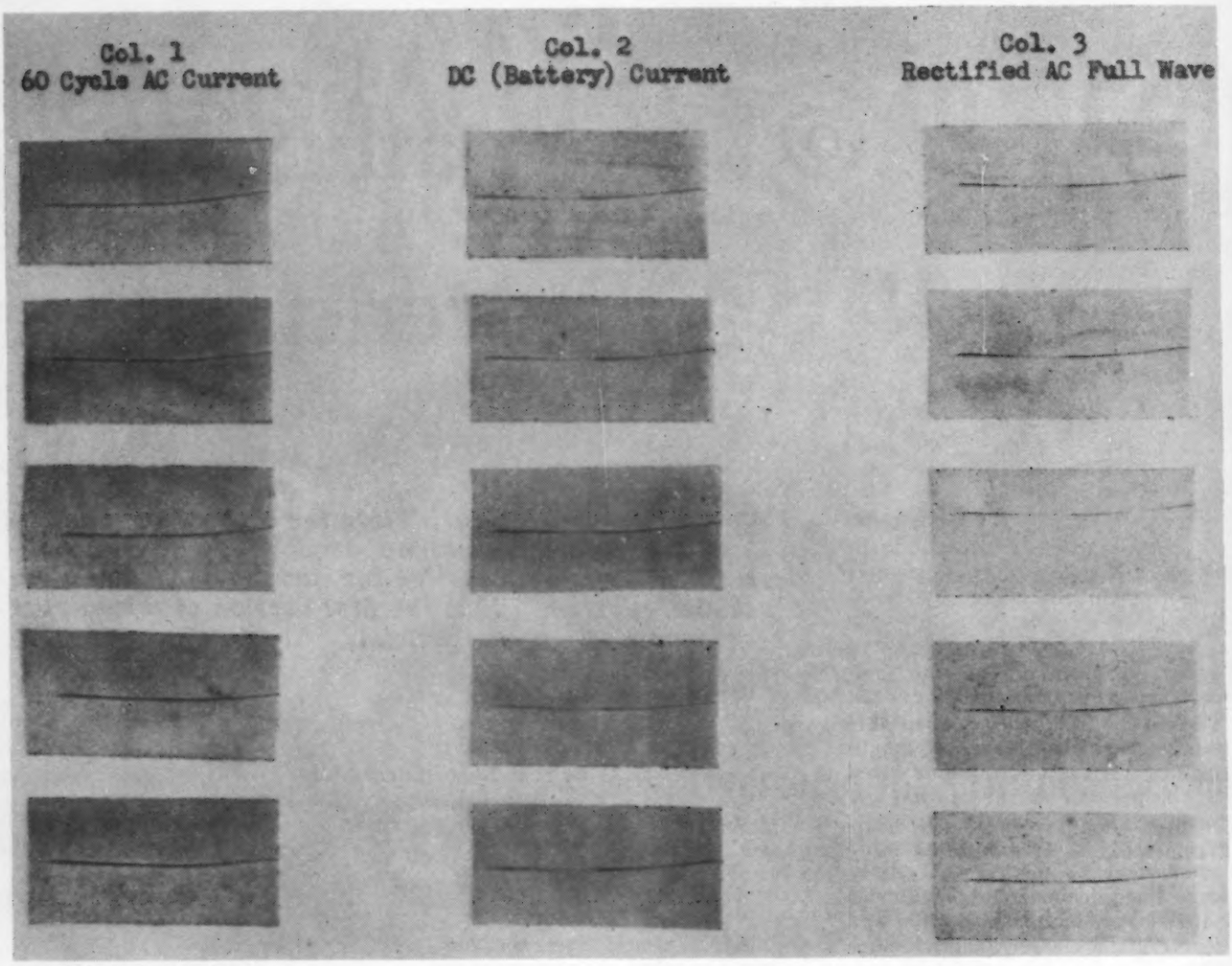

FIG. 1—Indications produced by surface seam in an aircraft piston pin under various testing procedures. Meter reading was 850 amp. in each test.

sons of the residual and continuous methods. The specimens used as illustrations were selected in each case from a large number and were chosen as giving representative patterns.

Investigation Procedure

The first step in this investigation was to check the experimental error involved in the procedure used in making these tests. Three standard magnaflux units were employed for the magnetization work. A suspension of standard magnaflux red paste No. 9 was used for all tests. A light oil distillate having the following characteristics was used for the suspensoid: A.P.I. gravity 46, Saybolt viscosity 31 sec., flash point, tag open cup 175 deg. F, initial boiling point 390 deg. F., end point 490 deg. F., color 25 Saybolt. Approximately 1.5 oz. of paste were used to each gallon of suspensoid. To avoid pattern variations due to possible differences in the amount of ferromagnetic material in suspension, the same suspension was used in all cases, being transferred in toto from one unit to the other as each series of tests was made.

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A study of the characteristics of various powders used for magnetic testing is contained in the article "Magnetic Testing," THE IRON AGE, Oct. 9, 1941, p. 64.

An aircraft piston pin containing an inclusion partly surface and partly sub-surface in character was used as the first test specimen. A set of five patterns was made with a magnetizing unit furnishing 60 cycle, single phase a.c. Another set of five patterns was made with a magnetizing unit furnishing d.c. from storage batteries. A third set of five patterns was made with a dry type rectifier unit furnishing full wave rectified a.c. from three phase, 60 cycle a.c. A meter reading of 850 amp. was used in each case, as this amount of current was found, after numerous tests, to be adequate to produce satisfactory indications with this specimen. The wet continuous method was employed in all cases. Timing of the relay system was set at ½ sec.

Circular magnetization was used in all cases, and special attention was given to centering the current carrying conductor through the piston pin and also to maintain a uniform flow of inspection liquid each time the operation was repeated. The indications were carefully dried in place, using carbon tetrachloride. They were then picked up using cellophane coated with an adhesive (Scotch tape) and transferred to sheets of plain white paper for photographing.

The patterns produced are illustrated in Fig. 1 and are seen to be very consistent for each machine. There is so little difference between

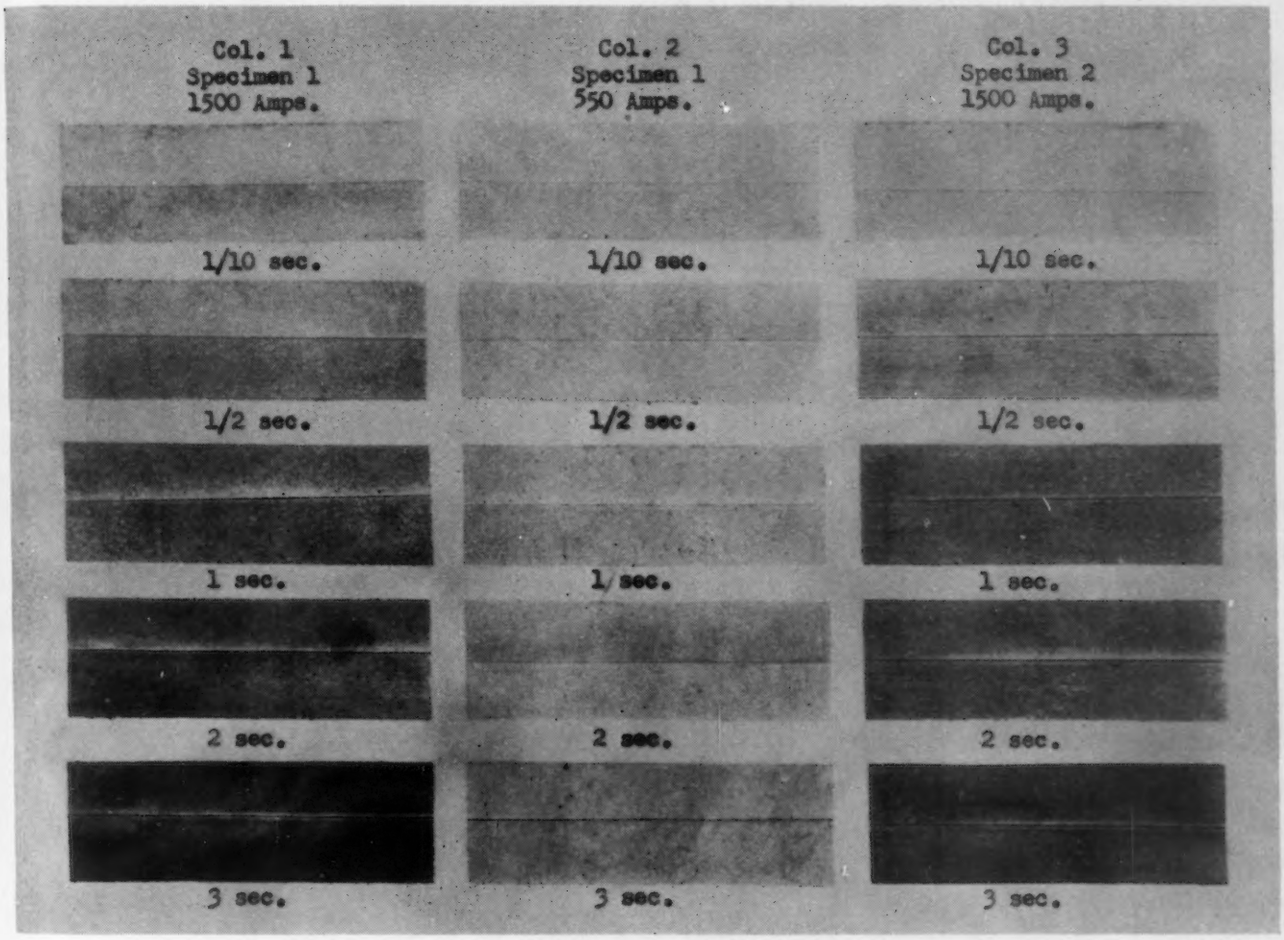

FIG. 2—Effect of the duration of current flow on the pattern build up. Magnetizing current was three-phase full wave rectified a.c.

the individual patterns in each group that they are for all practical purposes indistinguishable. It is therefore safe to conclude that patterns produced by different magnetizing procedures may be compared and the differences attributed to real differences in leakage fields and not to experimental error.

To determine the effect of duration of the current flow on pattern formation, or build-up, another series of tests was made. Two specimens, each containing a representative surface seam, were selected for the test. The results are seen in Fig. 2 in which columns 1 and 2 show patterns obtained with specimen No. 1, and column 3 those obtained with specimen No. 2.

All the tests in this series were made with a magnetizing unit delivering full wave rectified a.c. as described above. In column 1, 1500 amp. were used; in column 2, 550 amp.; and in column 3, 150 amp. The duration of the current flow was for periods of 0.1, 0.5, 1.0, 2.0 and 3.0 sec., respectively. Examination of each column reveals a gradual increase in intensity of field from top to bottom, which is due to the general field leakage from the entire specimen.

As the duration of the shot is extended, there is an increasing build-up of particles over the entire surface of the specimen. In column 2, a magnetizing current of only 550 amp. was used, which, according to prevailing practice, would be considered a rather light magnetization. While there is still a gradual darkening of the general background from top to bottom in this column, indicating an increase in the general leakage field, the increase in darkening is not nearly so great as in columns 1 and 3.

This illustrates that within rather definite limits, both magnetizing current and time are effective in determining the general background build-up. It is generally agreed that excessively dark backgrounds are undesirable for this type of inspection for the reason that they may minimize the contrast between the indication and the background.

Conclusions

It may be concluded from the results of these tests that where an adequate amount of magnetizing current is used the indication obtained with a current flow of 0.1 sec. would be considered satisfactory in most cases. The indication obtained with a current flow of 0.5 sec. is entirely satisfactory even where the magnetizing current was only 550 amp., which, according to present practice, would be considered too low. Finally it appears that there is little to be gained by permitting the current to flow for a period longer than one-half second.

The same specimens used for the determination of experimental error due to pattern variation illustrated in Fig. 1 were also used for a comparison of a.c. and d.c. for locating surface defects with the wet continuous method. Referring to these patterns and comparing columns 1, 2 and 3 in the patterns

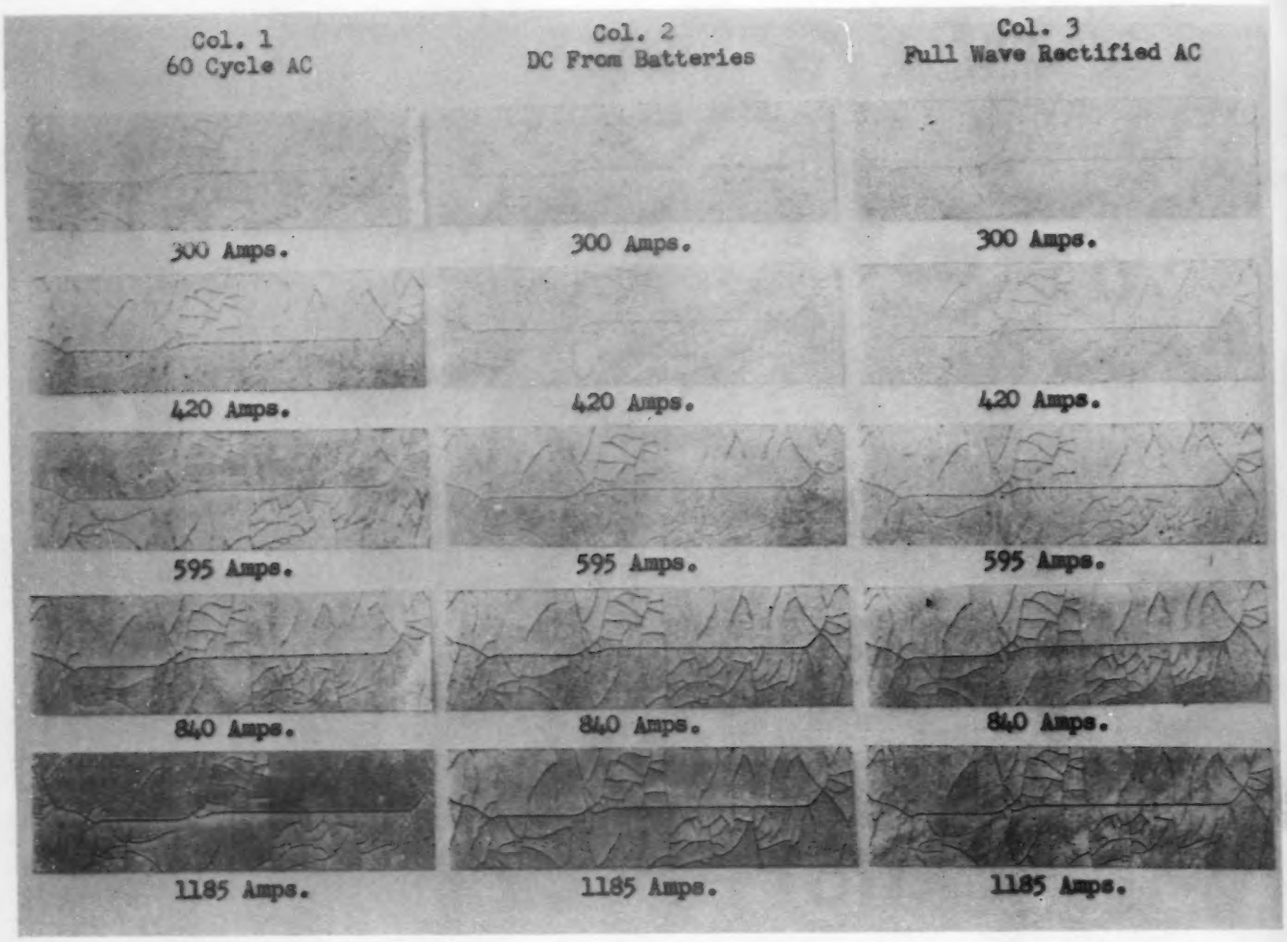

Fig. 3—Comparative results on grinding checks. Indicated amperes are meter readings.

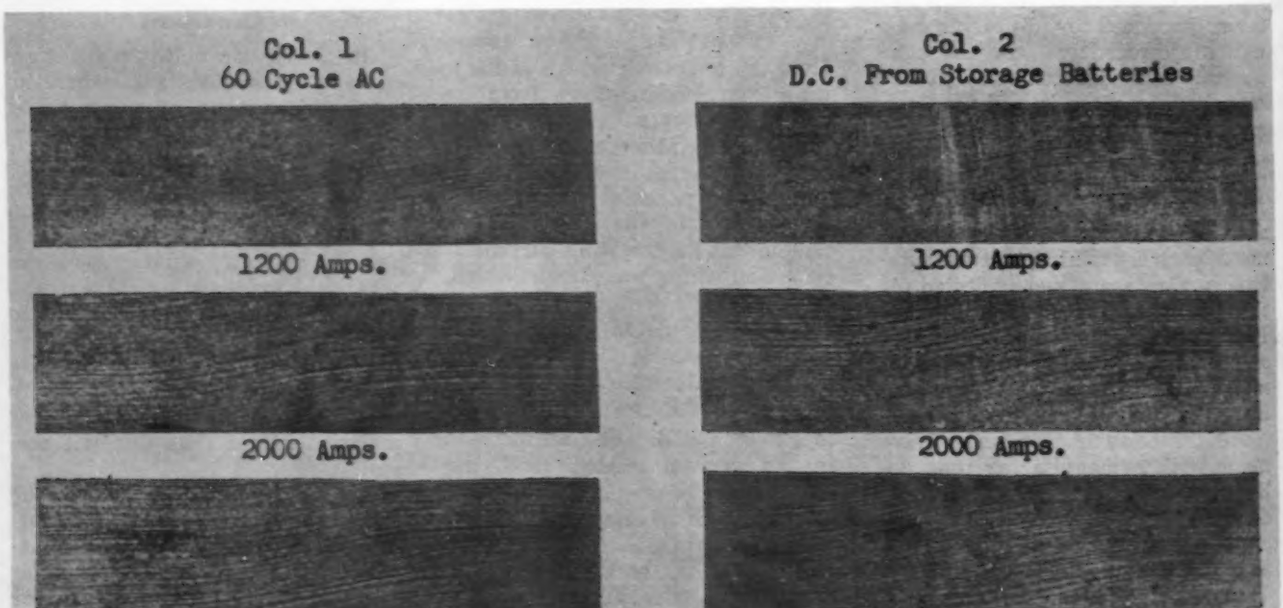

Fig. 4—Flow lines brought out by intense magnetization.

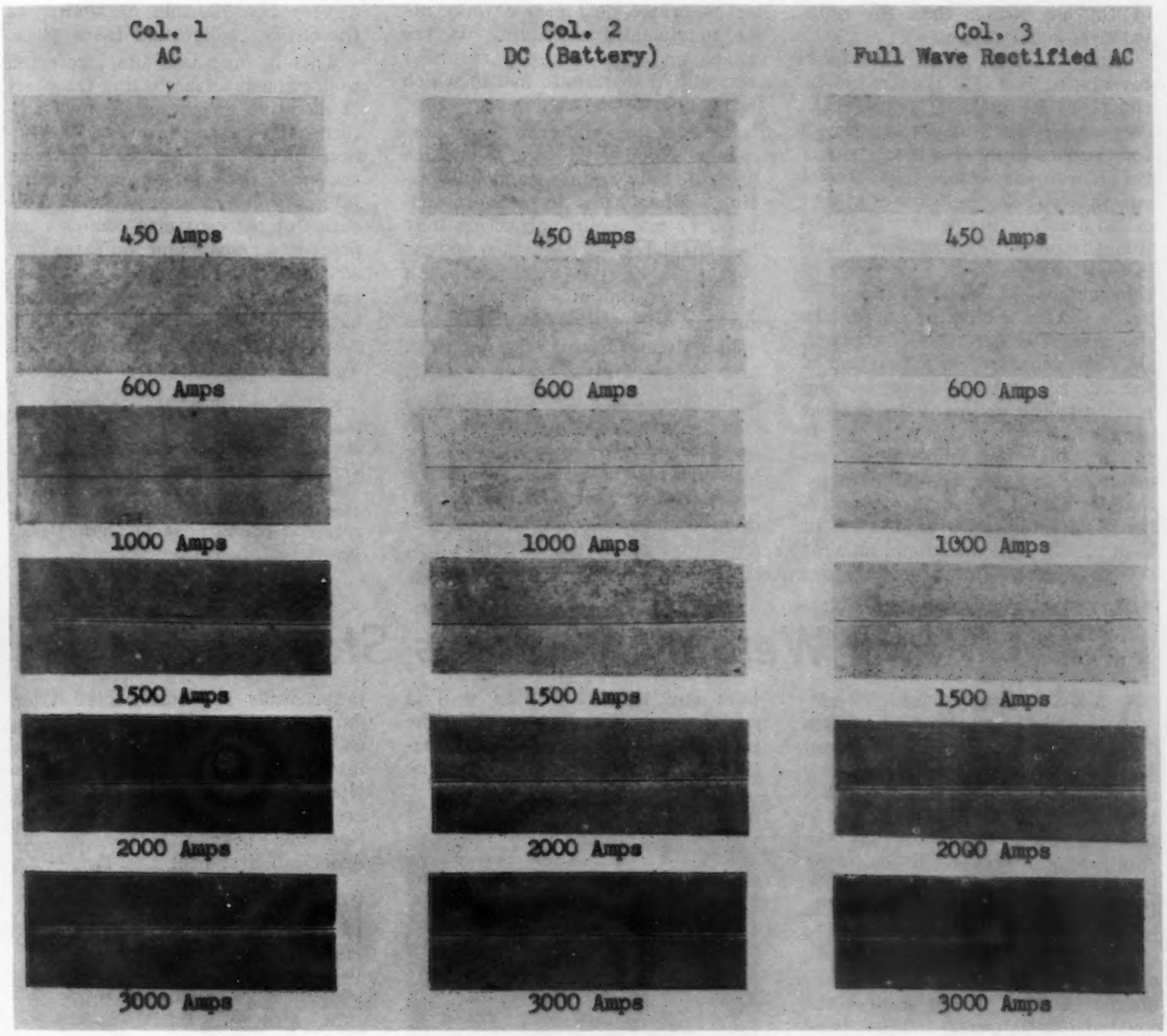

FIG. 5—A comparison of the various procedures tested on the same surface seam.

which were made by a.c., d.c. and full wave rectified a.c., respectively, it is seen that the indications obtained were more clearly brought out by a.c. than by d.c.

The basic of current comparison, of course, is r.m.s. amperes as against d.c. amperes; this, however, is a normal basis of comparison between a.c. and d.c. magnetizing units. Theoretically a.c. should show a greater magnetizing effect at the surface of the magnetized specimen as the peak of the a.c. wave is 1.41 times higher than the straight d.c. This peak, although of short duration, is effective in producing a higher magnetization at the surface where there is no question of lack of penetration due to eddy currents.

The indications in the third column from full wave rectified a.c.

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are comparable to those obtained from the battery unit in the second column, and are also distinctly inferior to those obtained from a.c. This result furnishes a double check on the two methods.

In Fig. 3 is illustrated the results obtained from a specimen containing a surface seam and a number of grinding checks. Meter readings from the three magnetizing units are given in the illustration. It will be seen that the indications obtained with a.c. (shown in the first column) are considerably sharper than those obtained by either d.c. or full wave rectified a.c., a favorable proportion being almost of the order of 1½ to 1.

Current Strength Effect

It is interesting to note how the indication builds up with increased strength of current. This is true not only of the general density of the pattern, but is also true of cracks which are theoretically at an unfavorable angle to the direction of circular magnetization. Here again the results obtained by d.c. and full wave rectified a.c. are practically identical.

It is also interesting to make a comparison of the indications of Fig. 3 on the basis of the peak value of the alternating current against the value of direct current. For example, the patterns can be matched as follows: 300 a.c. to 420 d.c.; 420 a.c. to 595 d.c.; 595 a.c. to 840 d.c.; 840 a.c. to 1185 d.c. These comparisons are currents in which the peak

of the a.c. rather than the r.m.s. value is equal to d.c.

Study of Fig. 3 on this basis reveals the fact that the a.c. indications are as good or better than comparable d.c. indications, except for the two highest currents where the pattern is so completely brought out that it reaches what might be called a saturation point. An additional important advantage of a.c. is that for equivalent sensitivity at the surface, at least 1.4 times as much d.c. as a.c. is required. In the case of either type of current, the heat generated is a function of the current actually being in proportion to the square of the current indicated by the meter reading. It follows that the amount of heat generated in using d.c. will be twice that for a.c., if the surface sensitivity is adjusted to the same level in both cases. The additional amount of generated heat may or may not be detrimental depending on the shape and size of the part under test and the ultimate use to which the part is to be put.

In Fig. 4 is illustrated the phenomenon called "flow lines" which show up only on intense magnetization. Flow lines from the standpoint of magnaflux inspection may be considered as a surface indication, the excessive current bringing out the direction of grain flow in the forging. This series of patterns shows little difference between a.c. and d.c. for a given meter reading.

Illustrated in Fig. 5 are comparative patterns obtained by a.c., d.c. and full wave rectified a.c. at various currents from the same surface seam. As current densities are increased from a minimum of 450 amp. to a maximum of 3000 amp., a very considerable darkening of the entire background takes place.

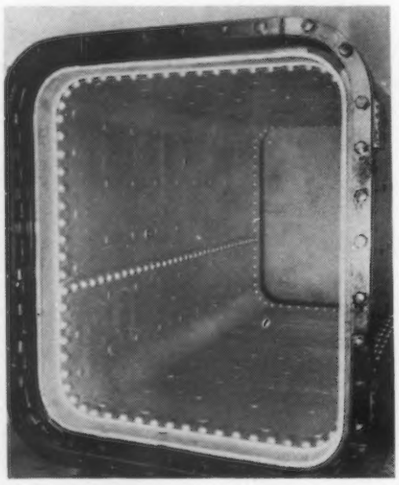
This is the same effect referred to previously in discussing the effect of duration of current flow on pattern build-up, and is due to the general increased leakage field from the entire specimen due to increased intensity of magnetization. This series of patterns also confirms the preceding results and indicates that a.c. is better than d.c. for surface seams, and that d.c. obtained from batteries gives practically identical results with that obtained by full wave rectification.

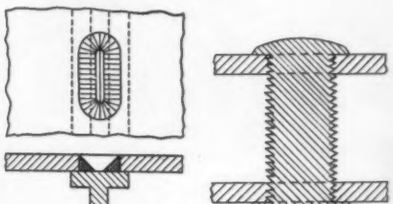
Editor's Note—In the next and concluding section of this two-part article, the author compares wet continuous and dry methods of magnafluxing for subsurface cracks and summarizes the advantages and disadvantages of each procedure as related to specific testing problems.

"Plug" Welding Replaces Staybolts

A NEW method of "plug" welding is being used to replace threaded staybolts in the construction of double walled sterilizer units used by hospitals. With this type of equipment, appearance is an important factor so that the elimination of staybolt heads in the interior is very much to be desired. Use of welded spacers between the inner and outer walls as shown in the sketch makes it much easier to obtain a smooth, polished surface on the interior, and a steam-tight construction is assured. Tests have shown that the plug welded structure will withstand steam pressures 30 per cent higher than with the staybolt construction, because the possibility of leakage is eliminated.

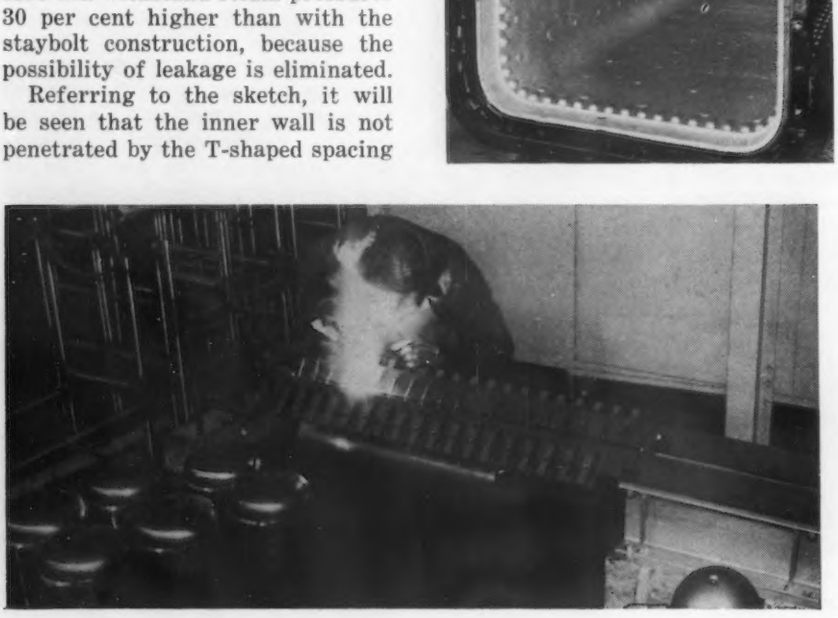
Referring to the sketch, it will be seen that the inner wall is not penetrated by the T-shaped spacing bars and that the outer wall is sealed thoroughly by the weld. The previously used staybolt construction is shown at the right. The inner walls are constructed from flange quality steel of 55,000 to 65,000 lb. tensile strength, with an interior finish of aluminum bronze. Nickel or monel clad inner surfaces are also used. This welded construction has been patented by the American Sterilizer Co., Erie, Pa.





ABOVE LEFT

SKETCH showing the new arc welding method (left) and the old staybolt method (right) of suspension of the inner walls of hospital sterilizers.



ABOVE

UNSIGHTLY staybolt heads have been eliminated in this hospital sterilizer unit by the substitution of the plug welding technique shown in the sketch. Except for a welded longitudinal seam, the new design presents a smooth interior.

LEFT

A WELDER fabricating tank for sterilizer unit, using a jig to hold the between-wall spacers in place until welded. Tank support is in the form of a cantilever beam so the cylindrical work can be slipped over the end.

Photographs by courtesy of the Lincoln Electric Co.

Electric Steel Plant Refractories

By J. H. CHESTERS
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. . . Continuing the series of articles on steel plant refractories, the author discusses refractories for basic arc and induction furnaces and considers the merits of monolithic and brick linings.

ALTHOUGH the proportion of the total steel output made in electric furnaces is still small, it is of vital importance due to the demands of airplane and automobile manufacturers for high grade alloy steels. The use of electric rather than gas fired furnaces enables steel of a more consistent quality and a lower content of non-metallics to be made.

Two main types of electric furnace are employed, namely:

(1) THE ARC FURNACE. This type is either "indirect" or "direct," according to whether the current passes from one electrode to another, only heating the steel "indirectly" by radiation from the arc, or passes through the metal bath, part of the heating being done "directly" by the resistance of the metal, as in the Héroult furnace.

(2) THE INDUCTION FURNACE. This type of furnace consists essentially of a crucible surrounded by a water cooled coil through which passes an alternating current. The metal in the crucible is heated by eddy currents induced in it and if the coupling is efficient and the insulation of the crucible adequate, the metal melts.

The bulk of electric steel is made in 3-phase arc furnaces of the Héroult type. These are usually lined with basic refractories, but acid lined arc furnaces are also employed, for example, for re-melting high grade scrap in steel foundries. The lining of such furnaces is similar to that of the acid open hearth furnace, the side walls and roof being of silica brick and the hearth of silica sand or ganister. The present survey deals solely with basic furnaces and in particular with the intermediate size, that is, the 10-ton type as shown in Figs. 1 and 2. Arc furnaces of only 1-ton capacity or less are however employed, for example, in steel foundries, while at least one furnace of 100 tons capacity has been built.

In most furnaces the current completes its circuit through the bath, but in the Greaves-Etchells furnace the conducting hearth acts as the third electrode. The hearth is made by mixing steel turnings with the basic refractory, the current passing through the hearth leaving by a copper plate in the furnace bottom.

In general, there are three carbon electrodes of about 1 ft. in diameter which pass vertically through the central region of the roof and are arranged at the corners of an equilateral triangle. The electrodes are made of graphite or amorphous carbon and are raised or lowered automatically by electric motors or hydraulic gear so as to maintain a steady arc. The voltage varies considerably with the size of furnace and the stage in melting or refining, but for a 10-ton furnace it is of the order of 90 to 220 volts. Since the power input is high, the amperage with this low voltage must also be high. It is of the order of 10,000 amp. per electrode. Amorphous carbon electrodes have a higher electrical resistance than graphite electrodes and, therefore, must be of a larger diameter.

Recent arc furnace installations contain a number of improvements. Thus, they usually include basket charging, as illustrated in Fig. 3.

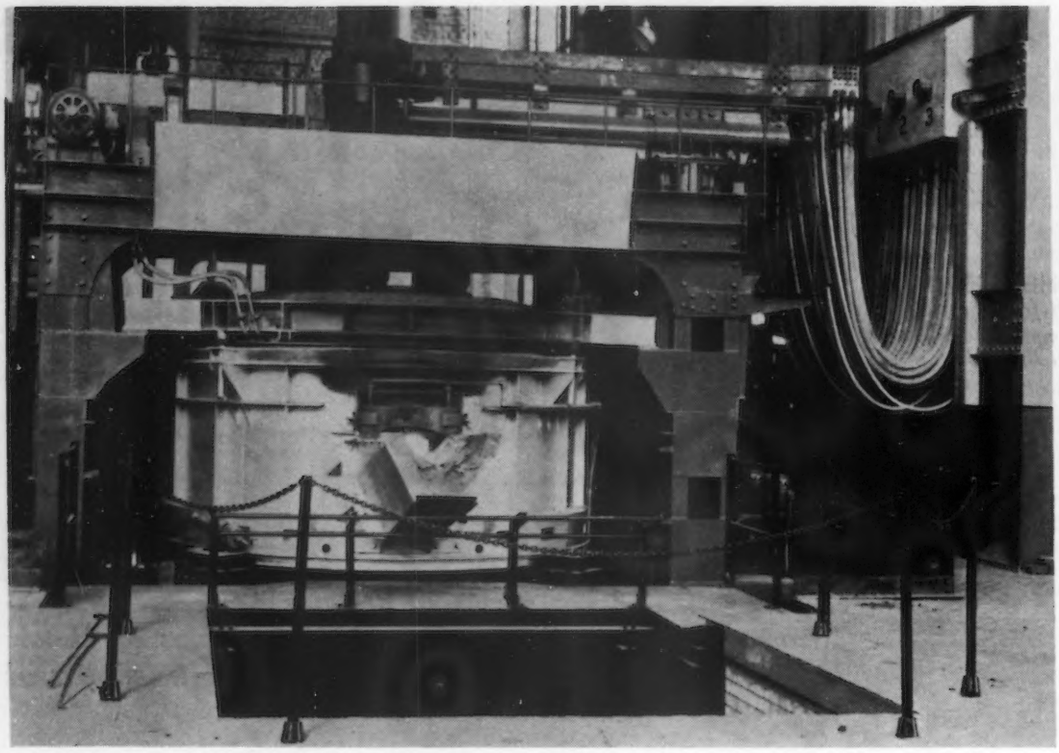


FIG. 1—This is a large, 10-ton, 3-phase, electric arc furnace with a flat top roof.

This is much more rapid than hand charging. With some furnaces the body of the furnace can be rotated; a refinement that is of advantage both from the point of view of steel making and the life of the hearth. With a 10-ton furnace the melting time is about two hours and the refining time about three and one-half hours, four charges being made per day.

The general arrangement of the refractories in a basic arc furnace is shown diagrammatically in Fig. 4. The construction is much less complex than that of an open hearth furnace and only three major divisions are considered necessary, namely, the roof, the side walls and the bottom.

The Roof

Construction:

The roof is either domed like that of a beehive brick kiln or has a flat central area as shown in Fig. 5. For the latter type of construction special shaped blocks are required, whereas the simple domed roof can be built almost entirely of squares and end arch brick. With both types of roof a special ring of brick, usually several inches thicker than the roof as a whole, is used to form the electrode holes or "bull's eyes."

Both with the simple domed roof and the flat topped roof, the rise is less than that of the open hearth roof, being about 1 in. per ft. of chord on a 10-ton furnace.

Most arc furnace roofs are of approximately uniform thickness throughout, but at certain plants a definite advantage is claimed for the use of a ribbed structure. This is generally of the radial type, the ribs being made either of silica or sillimanite. With such roofs, it is possible for a small area to become abnormally hot and thin without any serious risk of the roof as a whole collapsing. It is doubtful whether the use of ribs offers any great advantage for small furnaces but for the larger type it is stated to be well worth while.

Arc furnace roofs appear to vary less in thickness than open hearth furnace roofs, a figure of 12 in. being typical. Where ribs are employed, these are generally about 3 in. thicker.

With silica brick the use of expansion allowances between the brick is considered essential. This is generally taken care of by tarred roofing sheet placed between the brick at intervals. The brick can be set dry except where they have to be cut and resurfaced. There is no objection, however, to the use of cement if this be considered desirable, provided it is of a quality comparable with that of the roof brick themselves.

Even at best, the life of an arc furnace roof is short and hence it is not surprising that insulation of such roofs has not been adopted. The use of insulation would not necessarily lead to an increased inside temperature, but, as with the

TABLE I
Grading of Basic Induction Furnace Linings

B. S. Sieves	Tyler Sieve Equivalents	Sample No. Per Cent					
		1	2	3	4	5	6
On 7 mesh	On 8 mesh	12.0	14.8	10.5	8.3	10.0	8.9
7 to 25 mesh	8 to 28 mesh	34.7	30.5	37.0	35.7	34.0	34.6
25 to 72 mesh	28 to 65 mesh	19.0	19.1	21.7	23.1	21.0	23.1
72 to 150 mesh	65 to 150 mesh	12.7	12.5	11.9	12.0	14.0	12.9
Through 150 mesh	Through 150 mesh	21.6	23.1	18.9	20.9	21.0	20.5

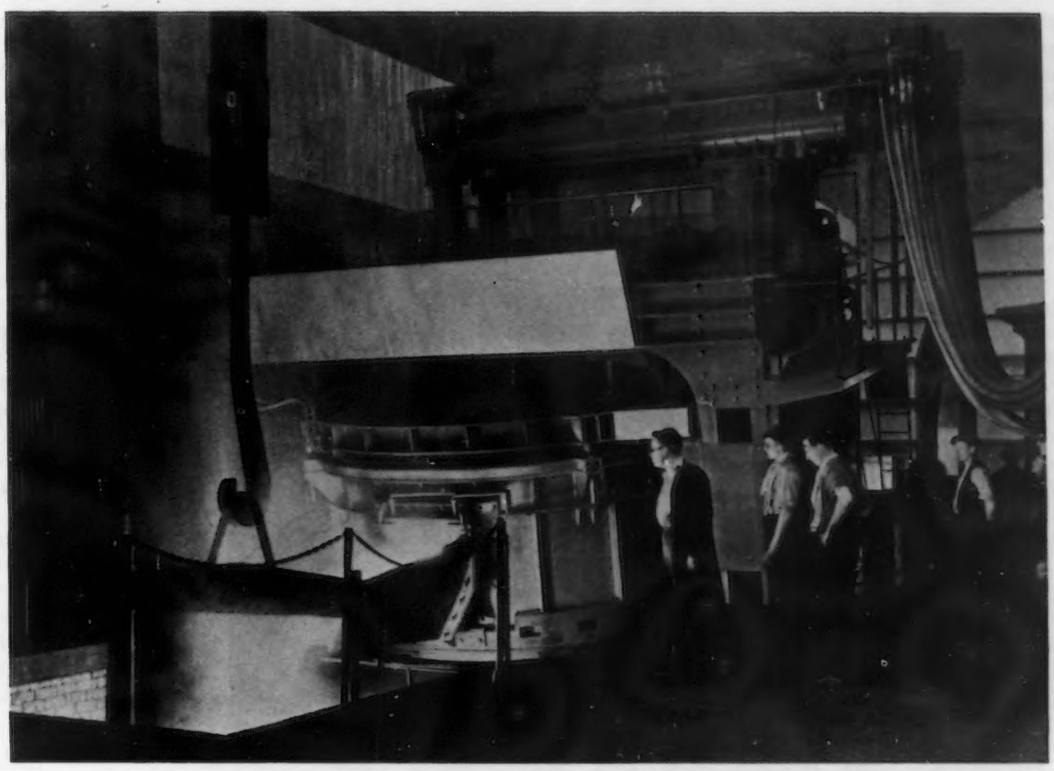


FIG. 2 — Tapping the 10-ton electric arc furnace into a ladle.

open hearth furnace, it would result in far greater wear if local overheating occurred.

Materials:

Most arc furnace roofs are made with silica brick, but for small furnaces better results are sometimes obtained with high alumina fireclay or sillimanite brick. It is stated that when sillimanite is employed, the thermal expansion of the material is so small and uniform and its thermal shock resistance so high that no expansion joints need be left. There is little doubt that but for its price, which is three or four times that of silica, sillimanite would be more widely employed.

No specifications appear to have been issued for silica brick for use in arc furnace roofs, but generally speaking, the properties required are those already discussed in connection with open hearth furnace roofs.* The shape of the brick must be excellent and there is much to be said for the use of as few special shapes as possible.

** "Basic Open Hearth, Above Sill Plate Level," THE IRON AGE, May 22 and 29, 1941.*

Roofs have also been constructed using magnesite, chrome-magnesite, and fused alumina brick, but the results obtained do not appear to have warranted the continued use of these materials except for very special purposes, as for the manufacture of ferroalloys.

Life and Causes of Failure:

The life of arc furnace roofs is short and variable. In some plants a life of 30 to 40 heats is considered reasonable, while at others 100 to 200 heats are expected. The life obtained varies greatly according to the practice, for example, hot charging is less severe on furnaces than cold charging, and long refining periods are clearly worse for the brickwork than short refining periods, particularly as the former involve the use of a good deal of limestone, the dust from which must be a factor in roof corrosion. Most of the wear appears to be the result of attack by dust from the furnace atmosphere, but if a roof is heated up or cooled too rapidly, particularly in the early stages of its life, spalling may occur.

The marked maturing observed with open hearth furnace roofs does not seem to take place in the arc furnace, possibly because the surface layers melt away before they have time to mature, or possibly because of the strongly reducing atmosphere. X-ray examination shows that the first zone in the particular arc furnace roof examined did not consist of cristobalite like the "A" zone in an open hearth

TABLE II

Influence of Magnesia: Alumina Ratio of the Firing Expansion of Spinel Forming Mixtures

Ratio of Magnesia to Alumina	7 to 25 Mesh Per Cent	25 to 72 Mesh Per Cent		Through 72 Mesh Per Cent		Linear Firing Expansion, Deg. F. Per Cent	
	Al_2O_3	MgO	Al_2O_3	MgO	Al_2O_3	1 Hr.	2 Hr.
50:50	45	5	5	45	..	2.7	6.8
40:60	45	..	10	40	5	6.3	8.3
30:70	45	..	10	30	15	7.4	9.4
20:80	45	..	10	20	25	3.3	3.3
10:90	45	..	10	10	35	0.7*	0.3*
0:100	45	..	10	..	45	1.9*	2.2*

*Shrinkage

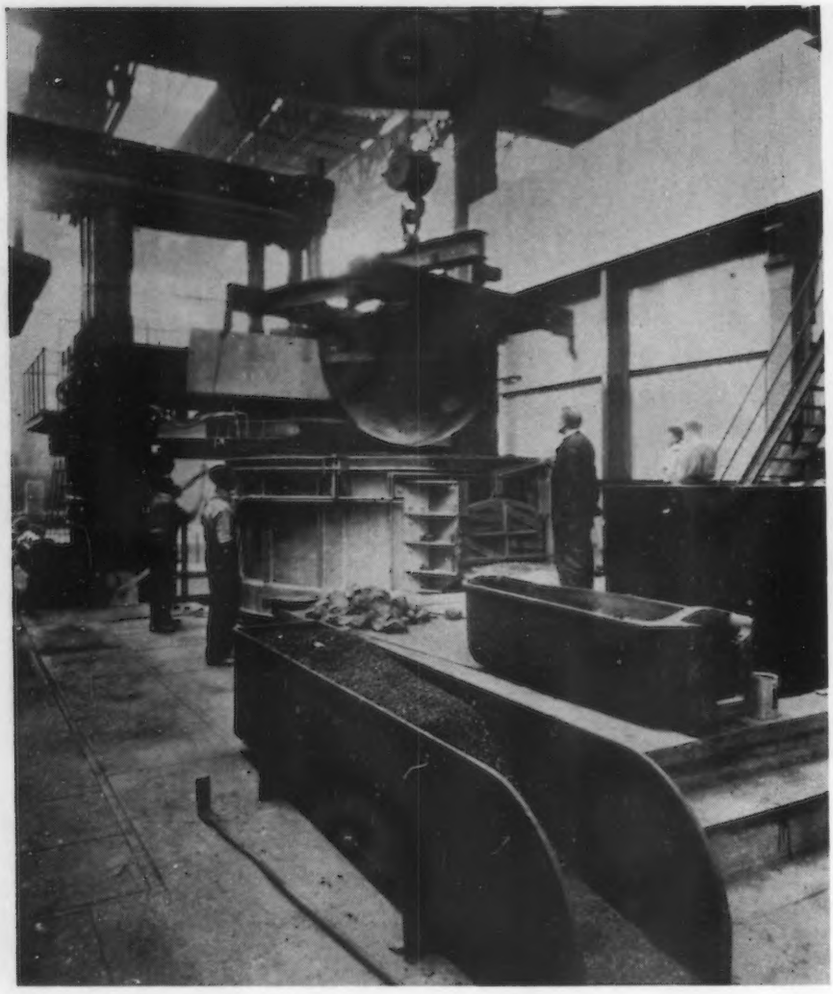


FIG. 3—Charging a 10-ton electric arc furnace by means of a basket type charger.

roof, but of tridymite, as shown in Fig. 6. This surprising result would suggest that the average temperature of the roof surface was less than 2680 deg. F., the tridymite-cristobalite conversion temperature. It is difficult to believe that the temperature was in fact so low during the refining period and if it were, that the roof would wear away so rapidly.

Both equilibrium data and practical experience with open hearth furnace roofs suggest that strongly reducing conditions greatly decrease the durability of silica refractories slagged with iron oxide, and it is probably this condition together with periodical intense overheating that explains the low life obtained with most arc furnace roofs.

Often a roof must be taken off before it has been uniformly worn out because there is some local weak spot. Thus the electrode rings frequently show premature wear, due to erosion and corrosion by hot gases escaping between the electrodes and the brickwork. Replacement of such a roof is sometimes overcome by the insertion of a new set of electrode rings in an old roof. The brick in the outer rings of the roof often show little reduction in thickness except where spalling has occurred.

The spalling of arc furnace roofs can be largely eliminated by careful handling of the furnace, provided the melting program does not result in its being subjected to frequent heating and cooling below red heat. Where the furnace is worked periodically, the use of superduty fireclay or other brick of higher thermal shock resistance is recommended. Longer lives could doubtlessly be obtained by the use of high bulk density silica brick and possibly by the use of brick made without a lime bond, but any marked improvement is likely to require the change to a more slag resistant material.

According to Leun, a considerable increase in life can be obtained by using sillimanite brick in the electrode rings and sillimanite spokes of about 9 in. width built radially. The real need, however, is, as with the open hearth, for an all basic furnace, the roof of which would have a much higher refractoriness and a vastly improved resistance to basic dust. The difficulty in the way of this development is the tendency of magnesite and chrome-magnesite brick to show structural spalling long before they have corroded away. With furnaces manufacturing stainless steel the use of such refractories is permissible, but in cases where chromium pick-up would be serious, the use of chrome containing refractories is undesirable because of the rapid rate at which spalled brick fragments become converted to chromium metal in the strongly reducing slags.

Side Walls

Construction:

The side walls of basic arc furnaces may be built of brick or may be rammed as a monolithic structure. The former procedure is more common, but where graded dolomite is available, for example, at basic bessemer plants, this material is often used for the arc furnace side walls and hearth. In general, monolithic side walls are built with an outward slope to give added stability, the material being rammed between the fireclay brick lined case and a steel faced template.

When brick is employed, the wall is generally vertical and the fettling material is brought as high up as possible in order to give the bricks maximum protection against slag. With 10-ton furnaces the brick side walls are commonly 18 in. thick. Thus, they may consist, as in Fig. 4, of an inside 9 in. course on the flat and two outside soldier courses, the one close to the case being usually of fireclay brick. The cylindrical section of the linings gives added stability since the bricks are keyed in position and are not as likely to fall into the bath as they would be in a straight wall.

Expansion allowances are made in the side walls either by putting insulating material, which is readily compressed, between the refractory lining and the steel case, or by leaving vertical joints in the brickwork. With some furnaces, a

gap is left between the outside of the brickwork and the inside of the case, the expansion allowance being about 1 per cent of the furnace diameter.

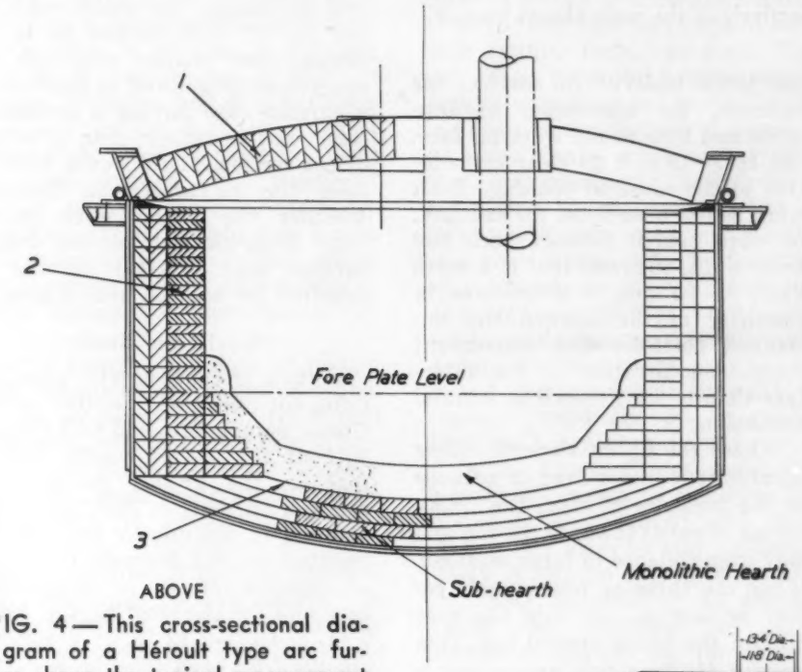
The bricks are set in good quality cement since it is essential that they bind together to form a solid mass so that any cracked brickwork remains in position. This is particularly important with furnaces having a rotating hearth since there is then no pressure between the roof and the side walls to give the latter added stability. No special shapes are required for side walls, ordinary standard squares, splits and tapered brick being employed.

Materials:

Magnesite brick may be considered as the standard lining for a basic arc furnace. They are used both fired and unfired and in the form of Metalkase brick. More recently, magnesite brick has been replaced by chrome-magnesite brick or even by semi-stable dolomite brick. These substitutes offer the advantage of lower conductivity and higher thermal shock resistance. The magnesite and chrome-magnesite brick used are similar to those employed in open hearth furnaces, while the semi-stable dolomite brick, although not widely employed, is finding an increasing application. It has good thermal shock resistance (25 reversals) and a much higher slag resistance than stabilized dolomite brick.

It is, however, customary to protect these semi-stable dolomite brick from roof drip by means of a top course of chrome-magnesite brick. With large furnaces, the top section of the side walls is frequently built of silica brick, but this procedure will probably disappear as it is doing with open hearth furnaces when more satisfactory basic brick becomes available.

The charging arch is usually built of silica, since it has been found the most suitable brick for this purpose, probably because of its remarkably high refractoriness under load. Its slag resistance is lower than that of basic brick, but this is no serious disadvantage in this position in the furnace. Magnesite brick is preferred for the tapping arch, a part of the furnace structure which frequently causes trouble. Attempts have been made to overcome spalling difficulties by the use of chrome-magnesite brick, but this procedure has one serious disadvantage, namely, the risk of



ABOVE

FIG. 4 — This cross-sectional diagram of a Héroult type arc furnace shows the typical arrangement of refractories: (1) The silica roof; (2) magnesite, chrome-magnesite or semi-stable dolomite brick side walls; (3) dolomite or magnesite monolithic hearth and dolomite or magnesite brick sub-hearth.

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BELOW

FIG. 5—This is the arrangement of the brickwork in a flat top roof for a 10-ton arc furnace. The special shapes used to form the electrode rings are of special interest.

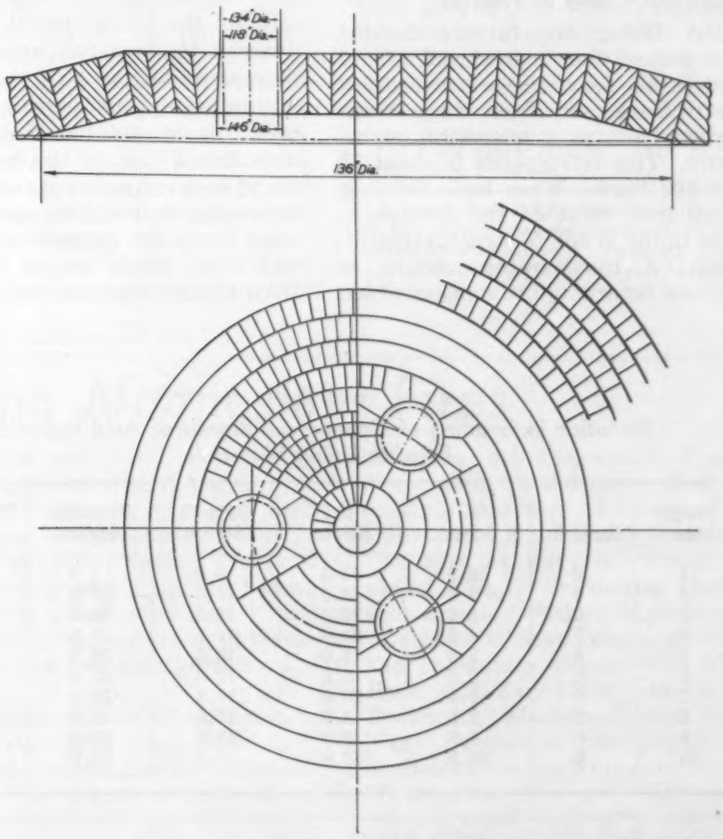

FIG. 6—These Debye-Scherrer X-ray photographs show the working face of an open hearth furnace roof (above), and an arc furnace roof (below), indicating cristobalite and tridymite respectively as the main phases present.

chromium pick-up in the steel during tapping.

The use of tarred basic (dolomite calcined at a high temperature) either in monolithic form or as unfired blocks, is fairly common in continental Europe and more recently side walls have been built with finely ground dry dolomite without any addition whatsoever. The life obtained with these monolithic linings would appear to be slightly less than that given by brick, while they have the added disadvantage that the time required for a repair is considerably longer. This latter difficulty does not occur when tarred blocks similar to those used in basic bessemer converter linings are employed.

Life and Causes of Failure:

A 10-ton arc furnace making alloy steel has a side wall life of three to four weeks when lined with brick, and about three weeks when built as a monolithic structure. This corresponds to about 75 to 100 heats. When basic brick is employed, most of the damage to the lining is due to structural spalling. A considerable amount is known regarding the changes which the brick undergo in service, for example, the absorption of iron oxide and lime at the working face, but there is still no clear explanation of the cause of spalling. Such work as has been done, for example, on open hearth furnace back and front walls, suggests that it is more likely to be due to differences in elasticity of the slagged and unslagged portions with consequent stress concentration at the interface than to a difference in thermal expansion.

Where the lining shrinks, either because it is under-fired or because of the presence of slag, the lining curves inwards towards the top and may even collapse in large sections. When the three or four weekly repair is carried out only the first 9 in. of the lining are cut out. This leaves a 4½-in. safety course, usually magnesite, and a further 4½ in. of firebrick between this and the shell. It is essential that at least this first 4½ in. of the inside 9 in. be of slag resistance material since otherwise it would be necessary to shut down the furnace as soon as the 9 in. inside course fell away even though this involved considerable interference with the furnace program.

The progress that has been made during the past few years and even months shows that a great deal has still to be learned regarding the best type of brick or ramming material for use in arc furnace side walls. There is no doubt that cooperation between the users and producers of these refractories will result in increased side wall life, but in the meantime something might be done from the furnace end by changes in design and by the use of such devices as tie-in strips. One change that has already been suggested is the use of a furnace case having a truncated cone section rather than a cylindrical section. This would help to keep the refractory in position whether the lining were monolithic or brick, but has the disadvantage that a larger furnace is required for a given hearth area.

Hearth and Banks

Certain recent hearth installations, such as those described in the Crespi patent, are said to be made without the use of hearth bricks, that is, the graded dolomite is rammed on the pan itself and only sintered in position by the heat of the steel making process. This type of construction is, however, still rare and for the most part at least 9 in. and often 12 in. of firebricks are used between the pan and the monolithic hearth.

The number of possible combinations of brickwork is large and there is a big furnace to furnace variation. Thus, in one furnace a 3-in. high temperature insulating brick is placed on the pan and above this are laid a 3-in. firebrick course and two 3-in. courses of magnesite brick. In a second installation, there is no insulation, the 3-in. firebrick course being placed directly on the pan and three 3-in. magnesite courses placed above it. In yet another arrangement the firebrick course on the pan is maintained but the 9 in. of magnesite brick are replaced by three courses of stabilized dolomite brick. These are arranged either in parallel strips across the furnace or in a series of rings, starting from the outside of the furnace and working towards the center.

In either case, the brick are so placed as to stagger the joints and thus avoid any direct line through which slag or metal might penetrate. If the brick are built in rings,

TABLE III

Variation in Grading of Commercial Brands of Acid Induction Furnace Lining Materials

Sample No.	On ¼ in.	¼ in. to 7 Screen	7 to 25 Screen	25 to 72 Screen	72 to 150 Screen	Through 150 Screen
1	0	36.0	53.5	3.0	4.5	3.0
2	0	2.0	13.0	11.0	47.0	27.0
3	0	5.0	20.0	10.5	34.0	30.5
4	0	4.5	22.5	11.0	37.5	24.5
5	0	5.5	19.0	10.0	38.0	27.5
6	0	2.5	18.0	10.0	37.0	32.5
7	0	5.5	20.0	11.5	39.0	24.0
8	0	2.5	13.0	11.0	41.5	32.0
9	0	1.5	13.5	11.5	46.0	27.5
10*	0	14.0	38.0	8.0	18.0	22.0

a variety of shapes is required, the taper on the bricks being more severe as the center of the furnace is approached. Each layer of brick is independent, that is, there is no bonding of one layer into another. The bricks are set to follow the curvature of the pan which also follows the curvature of the central portion of the hearth. Chrome brick or plastic chrome cement is sometimes used as a separating layer between the firebrick on the pan and the magnesite hearth brick. There is naturally still some reluctance to using stabilized dolomite brick in so vital a position, but both the experience in open hearth furnaces and first-hand experience in arc furnaces suggest that such brick is quite adequate for the purpose. The magnesite bricks used in the sub-hearth are similar to those used in open hearth furnaces, while the firebrick course is generally of a quality similar to that employed in open hearth furnace doors.

The general technique of installing a rammed or monolithic hearth in an arc furnace is similar to that employed with the open hearth furnace, but there has been a tendency to use a more finely ground material. This is undoubtedly due in part to the difficulty in obtaining at all conveniently the heat required for sintering in the hearth. In Great Britain, the hearth usually consists of tarred basic, dolomite calcined at a high temperature, rammed in successive layers and burnt in position by placing coke and old electrodes on the fully rammed hearth and turning on the power for a burning-in period of about 36 hr. It is stated that with the dry rammed dolomite hearths a practice similar to that employed in the induction furnace can be used, that is, the metal charged can be relied on to produce adequate sintering of the hearth. The banks are built up, as in the open hearth furnace, by using wooden templates and forming a series of steps. Both in the hearth and in the banks it is desirable that each course of tarred basic be roughened after ramming so that the next layer can "knit" into it. The final depth of hearth varies considerably but is generally of the order of 9 to 12 in.

Whichever way the hearth is made, it should be hard and smooth after the first cast and require very little fettling for a long time. The life of a dolomite hearth varies greatly according to the steel making practice and the size of furnace. At some plants, a life of only 200 heats is considered satisfactory, but with a 10-ton furnace a life of 600 to 1000 casts or say six months to a year is expected. The finishing slags are always strongly reducing and the basic in the hearth turns white and becomes very dense. X-ray examination of samples removed from one hearth showed it to consist essentially of magnesia, lime and tri-calcium silicate.

In the United States, magnesite hearths are commonly employed, the material being bonded with basic slag, water glass or clay. Alternatively, it may be burned in position in layers by striking an arc between the electrodes and other electrodes placed on the hearth which are removed and reset as each new layer is burned in position. According to Soler and Hite, Austrian and Washington magnesite, dead burned periclase or dolomite, chemically precipitated magnesia, and Brucite, have all given satisfactory results.

There is no doubt that, given careful fettling, an arc furnace bottom could be made to last almost indefinitely, but once it gets out of condition, and in particular when it contains a good deal of metal, the amount of fettling required goes up, and there is a serious increase in fettling and "bad bottom" time. Since the installation of a new bottom is comparatively simple and since the cost is quite small when spread over the long life, it is better to renew a bottom than to keep on using it when it has obviously passed its optimum life, and might at any time allow the metal to break out.

The increased use of electric furnaces during the last few years has led to intensive research on the technique of hearth installation and there is little doubt that the refinements now being introduced will result in improved bottom life and reduced fettling time. Other developments, such as the employment of a rotating hearth which distributes the intense heating over a large area of the bath, will also help.

The refractories used in the door and launder on an arc furnace are similar in properties to those employed in the open hearth furnace. Thus the doors are usually lined with a 35 to 38 per cent alumina fireclay brick having a melting point of about 3110 deg. F., while the launder is lined with similar brick parged over with "ganister," clay bonded quartzite. This latter material is prepared in the manner already described in connection with open hearth furnaces.**

** *"Basic Open Hearth," THE IRON AGE, Aug. 7, 14, and 21, 1941.*

Editor's Note: The concluding section of this article was inadvertently printed in the issue of March 5. In it Mr. Chesters discussed refractories for induction type furnaces, etc.

Extinguishing Magnesium Fires

HARD coal-tar pitch in granulated or flake form is superior to sand, water spray and some other compounds for extinguishing magnesium fires, according to Dr. R. R. Sayers, director of the Bureau of Mines. It is claimed that this pitch is equally effective in combating incendiary bombs.

The hard coal-tar recommended by the bureau is sometimes called "fuel pitch" and it is said that it can be made available through a number of commercial firms at a reasonable cost.

The granulated or flaked form is required because a powdered pitch has explosive characteristics similar to coal and other dusts. The hard pitch recommended by the bureau will soften at about 300 Deg. F. and while soft forms an air-tight blanket over the fire, extinguishing the flames.

In addition to its effectiveness in blanketing small magnesium fires, the pitch method has the added advantage in industrial applications, according to the bureau, in that it is not abrasive and is not likely to damage machinery in the event of a fire during a machining operation.

A more detailed discussion of the use of pitch for smothering magnesium fires is contained in the report "Methods of Extinguishing Fires and Incendiary Bombs with Very Hard Coal-Tar Pitch," by H. R. Brown, I. Hartmann and John Nagy. Copies of this report are available from the Bureau of Mines, Washington.

• • • How Savage Arms Makes the

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By J. B. NEALEY

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THE amazing speed with which America, peace bent for years, is achieving mass production of war materiel is due in great part to the Ordnance Department of the U. S. Army. It has three programs under way. First, it has several manufacturing arsenals operating full time; second, it is helping to change over an increasingly large portion of industrial America to the manufacture of combat equipment and third, it is building many more plants for the production of war materiel—a multi-billion dollar program of Ordnance-owned facilities.

Among these latter projects is a several million dollar contract for equipping a plant and producing 0.30 to 0.50 cal. Browning machine guns. This was given to the internationally known Savage Arms Corp., Utica, N. Y., which was already in mass production of the famous "Tommy" gun (Thompson submachine gun) for Great Britain, China and others. The latter is also being produced for the U. S. Ordnance Department for use in combat tanks, scout cars, etc. Parachute jumpers also are equipped with it. A year ago last October production on this item was large but the rate was accelerated by 375 per cent in the following 12 months and is still increasing.

The contract for the Browning machine gun was obtained in September, 1940, and 15 months was stipulated for tooling up and getting under way. Savage Arms bettered this schedule by getting into production four months ahead of the time specified.

The research, design and development and the methods of manufacture of ordnance items are divided among the U. S. Ordnance arsenals. Of these the Springfield Armory has been charged with the development and manufacture of muskets, rifles and machine guns ever since it was built at the instigation of General Washington in 1794. This arsenal is responsible for getting a company like Savage Arms into production as here was developed much of the modern equipment for making rifles and machine guns.

There are 64 major parts to the Browning machine gun, besides 27 springs and 218 minor parts. In the operating and retracting slide assemblies there are 55 more parts, bringing the total to 364. In the manufacture of these parts 3500 machine operations are involved, each of which requires a gage, a holding fixture and a cutting tool.

All drawings for the gun, including the drawings for the U. S. Inspection gages, were furnished by the Ordnance Department complete in all details. It has been found that, ignoring minor discrepancies, the gun when made in strict accordance with the Ordnance Department drawings functions with unbelievable reliability. For instance a gun picked at random at the Savage Arms plant has gone 26,000 rounds without any malfunction whatsoever and without breakage or serious wear of any part. The Ordnance Department was also of great assistance in the procurement of machine tools, and the Small Arms division of the Office of the Chief of Ordnance has been and continues to be of continual help in the solution of technical problems which arise in connection with production.

Gage Control

The War Department in general has thrown open to the company all of its resources. For example, the gage inspection laboratory at Savage Arms was patterned closely after the laboratory at the Springfield Armory, which cooperated unstintingly in providing all necessary information. The Springfield Armory system of gaging was also adopted as being the best yet developed. The differences between

NEW type of automatic profiler which greatly reduces cutter breakage by eliminating hand feed for the coordinate directions of travel of the work.

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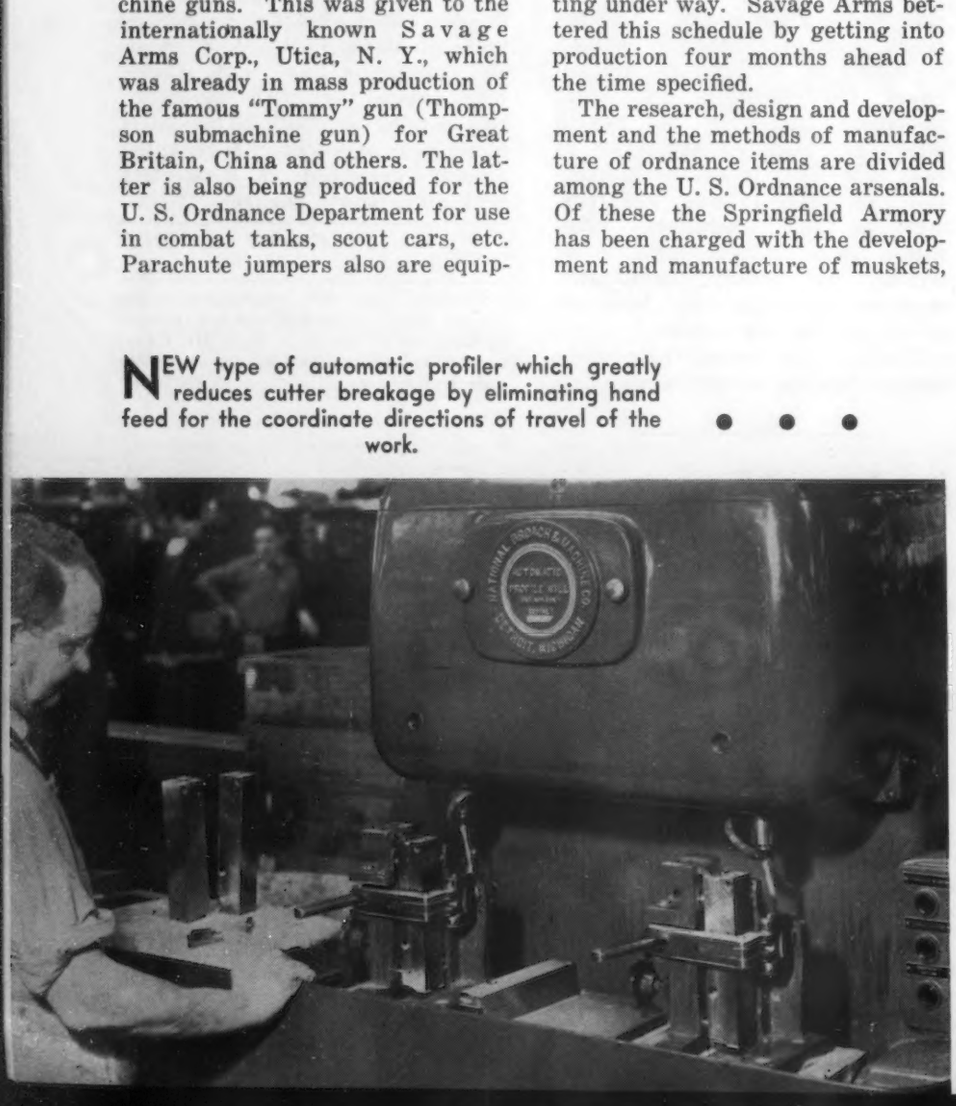

Browning Machine Gun

. . . Many of the manufacturing problems encountered in the mass production of this well known weapon were worked out under the guidance of the U. S. Ordnance Department and the Springfield Armory.

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the work and inspection gages is predicated on a very logically and carefully planned system of allowances and tolerances, rather than an application of arbitrary differences.

The Springfield system of controlling gages in the shop is also employed with great success. Traveling gage inspectors make frequent checkups of gages in use and keep detailed records of wear not only so that gages may be replaced at the proper time, but also that records may be built up from which the life of all gages may be accurately predicted. For example, certain thread gages have been found to wear to the point of unserviceability in periods as short as four or five days, and it is obvious that unless frequently checked, gages may pass a great deal of bad work. By maintaining a careful control of such danger points, these gages may be withdrawn from the job before bad work occurs and replaced with new ones. Needless to say, this is a very important factor in maintaining the high degree of quality required by the Ordnance Department.

The principal kinds of machining operations employed in the manufacture of fire arms in general, and machine guns in particular are milling, drilling, profiling and grinding. The amount of grinding required on the 0.50 cal. Browning machine gun is more than ordinarily high due to the requirements of close tolerances and high finish. Most of the other common machining operations are also represented, such as broaching, turning, punch press operations, shaving and slotting operations and a considerable number of hand operations such as burr filing and sub-assembly operations together with the usual requirements for heat treating, finishing and assembly.

Tumbling is being used extensively on finishing of component parts, cutting costs, saving time in process and making possible a final quality obtainable otherwise only by a highly skilled grade of labor not now readily available. The tumbling equipment employed is in general similar to that being used in other machine gun plants at the present time, although the process for the purposes mentioned is not new to Savage Arms. A few years ago this company encountered difficult problems of finishing components to the high degree of quality necessary in a popular priced semi-automatic 0.22 cal. rifle. It was found that the finishing of components necessary to reliable functioning of this type of arm could be readily and reliably obtained by tumbling and burnishing.

The unusually high number of grinding operations required in the production of the Browning gun is due to three principal causes: (1) High degree of accuracy and surface finish required in finished components; (2) correction of distortions in heat treatment, and (3) preparation of materials for subsequent operations by establishing an accurate working surface. Although constant effort is being made to reduce the necessity for ginding in order to correct distortions in heat treatment, and some headway has been made, there will probably always be a certain amount of such corrective grinding required in the production of highly accurate gun parts.

One of the biggest problems in the production of gun parts is represented in the unusual quantity of

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BARREL burnishing or tumbling is being used extensively on finishing component gun parts, cutting costs, saving time in process and giving a quality otherwise obtainable only by use of highly skilled labor.

RIFLING of the barrel. This type of machine uses a single fly cutter and the helix angle is controlled by the sine bar attachment shown at the rear.

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special shapes which in most cases must be produced by machining, since the degree of accuracy and physical properties of material required do not permit the use of other methods such as die casting. One of the common instances of producing such irregular shapes is by profiling or by profile milling, using a special type of machine in which a vertical mill spindle is guided with relation to the work by means of a guide pin which follows the contours of a template. The movement in two directions in the horizontal plane is controlled by the operator by means of handles which move the spindle carriage to right or left and the work carriage back and forth. The production of the templates or formers is a very difficult and intricate job, and the operation of the machines requires a rather highly developed skill on the part of the operator as a great part of the success of the operation depends upon the operator's sense of touch. Needless to say, cutter breakage is very high.

In an effort to reduce this hazard, especially in these times when cutters are difficult to obtain, a new type of automatic profiler was developed under the guidance of the Springfield Armory and has recently made its appearance on the market. Savage Arms is making extensive use of these profilers. These machines will, in general, do all that the hand operated machines will do, but have the enormous advantage of uniform mechanical feed which not only greatly reduces cutter breakage, but also contributes largely to the quality of the work produced. Even though the machines themselves, which are controlled by intricate hydraulic and electric circuits, are complicated and difficult to adjust, it is felt that an advantage is gained by having to provide only a few highly skilled mechanics for the maintenance of the machines which can then be operated by common labor, rather than the great number of highly skilled hand profiler operators which would otherwise be needed.

BARREL drilling on a double spindle machine. These deep hole drills have a hole down the length through which coolant is forced under pressure to drive the chips out of the hole through the single, straight flute along the drill.

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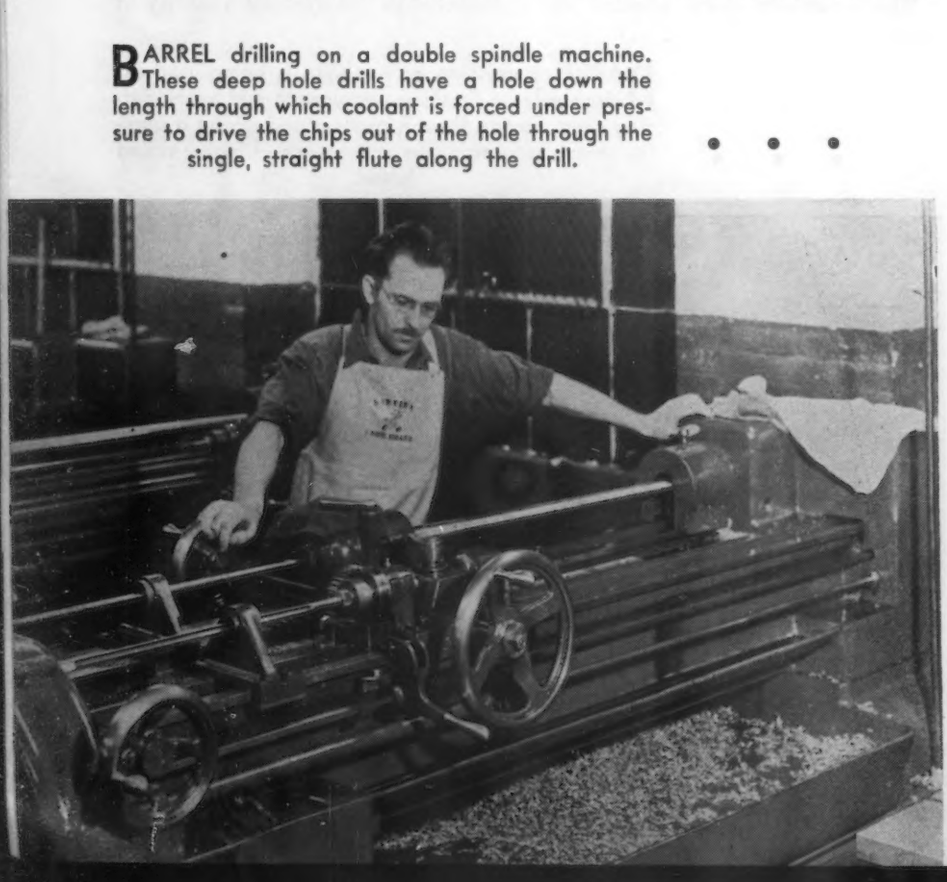


Form Milling Cutters

Due to the great quantity of irregular shapes which must be produced by milling, a great many form milling cutters are required. Relatively few of these are of the eccentric relieved form cutter type. Most of them are of the contour ground type in which the back of the tooth is ground on a special grinding machine to a hardened template. Therefore the shape of the tooth is renewed each time it is ground. This system has certain advantages over the form relief type cutter, in that slight changes in shape may be readily made simply by changing the template. The back of the tooth, by being ground, does not present a surface having roughness or decarburization as a result of heat treating. An enormous quantity of such cutters is used in the production of the 0.50 cal. machine gun and their production presents a major problem inasmuch as many small shops experienced in the production of ordinary types of milling cutters are quite unfamiliar with this kind.

Provisions have, therefore, been made for the production of cutter blanks of this type in a particularly efficient manner by the employment of a duplicating device which may be attached to lathes and milling machines. By their use any desired quantity of turned blanks may be produced on a lathe to the proper form automatically from a simple template whereas formerly the usual method was to hog the metal away by means of the longitudinal and cross feed controls of the carriage operated solely by hand and dependent entirely on the skill of the operator as to results.

When this control is applied to a milling machine, the formed backs of the teeth of such cutters are automatically produced after the blank has been gashed by a simple milling operation. Here again a simple template is used in conjunction with the duplicator which is attached to the machine. From the template the duplicator automatically controls the longitudinal and vertical feed of the table to produce the required shape, whereas formerly the longitudinal and vertical feeds had to be manually operated by a toolmaker with the results being entirely dependent upon his individual skill. The use of this device has made the production of these relatively complicated and heretofore extremely difficult to make milling cutters a simple job which can be done in large quantities with toolroom help of only medium skill.

Reamer Grinding

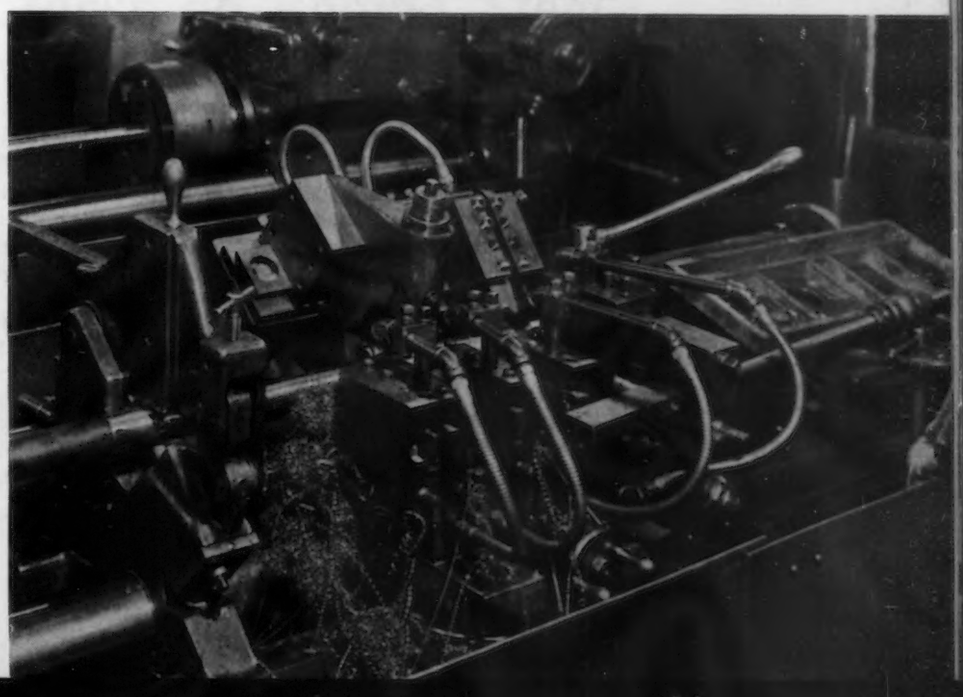
One departure from usual practice has been the production of barrel bore reamers having an eccentric relief ground on the back of the teeth, thus eliminating the necessity of hand honing. Heretofore the honing of these reamers has been one of the greatest difficulties encountered in barrel making. The operation, which is done entirely by hand, requires an extremely high degree of skill which must usually be developed on the job and even then the number of people who can be properly trained to do this is small. Instead of grinding the reamers with circular land and then painstakingly and slowly honing the land into some approximate semblance of an eccentric relief, the eccentric relief is now accurately ground with a small grinder, now on the market, built for that purpose. This makes it possible to eliminate a large part of the hand honing inasmuch as the reamer may not only be used as it comes from the grinder, but also may be resharpened by grinding on the face of the tooth instead of honing the back of the tooth by hand. This promises to be a great aid to barrel production. The procedure has been found also to be equally successful on chamber reamers which are even fussier than the bore reamers.

Another departure from past practice is the use of a newly developed method of atmospheric hardening. A batch, muffle type furnace is employed in which vaporized lithium is carried through the muffle with the products of combustion. This element has the peculiar property of having a greater affinity for oxygen than any of the other elements present in the muffle, including the material to be heat treated as well as the gases being passed through it. The oxygen present is immediately formed into harmless compounds so that the resulting atmosphere is truly neutral and not just balanced. The furnaces employed are equipped with agitated, temperature controlled quench tanks located below them with chute discharge so that the work is quenched directly from the muffle without passing into the outside air. This has been found to be an extremely successful method for the hardening of the great quantities of small parts found in gun manufacture. The advantage over the balanced atmosphere types of furnaces is that different grades of steel may be treated in it without any special adjustments. In other words, one setting of the furnaces will do for materials of any carbon content.

For carburizing work, this furnace has a further advantage in that the carbon content of the case can be controlled with surprising accuracy by shutting off the carburizing ingredient of the atmos-

• • • PULL broaching is a frequent operation on small gun parts.

• • • TURNING the 0.50 cal. machine gun barrel in a Fay automatic lathe. The barrel is mounted on centers and is supported by a three-roll steadyrest shown. Control of the tool infeed is by cam form plates on the front and rear of the machine.



phere, after the work has been exposed to it for a sufficient length of time, and allowing the neutral atmosphere to pass through the muffle for a long enough period to permit the carbon in the case to diffuse to the desired amount of concentration. This means that the small highly stressed, impact-loaded parts of gun mechanisms can be given most of the benefit of the surface hardness of case hardening without the disadvantages of a sharply defined line of demarcation between the case and core or the extreme brittleness of the usual hypereutectoid case. Although experiments along these lines have only just been started, much hope is entertained for the benefits which may result.

The fact that in the past the company has had to use as much as possible general purpose equipment has stood Savage Arms Corp. in good stead at this time in enabling it to go quickly into mass production with the machines available on the market. Furthermore, while the expenditure for equipment was thought to be relatively large in terms of the number of guns to be produced, it was the company's policy to spend the government's money for equipment which at any time could be readily adapted, if deemed desirable, to production of other military models. As a result, changes in model may be made immediately and efficiently, and the equipment can also be used with relatively few adjustments for other military arms should the national emergency require it.

Also, should the need arise this company could quickly and smoothly move into mass production on a number of related items of war materiel. This would not be the case had it purchased a large number of special machine tools.

SEMI-AUTOMATIC shaving machine of special design developed at the suggestion of the Springfield Armory.

Contrary to equipment layout in *high production* industries, this company does not use line production arrangements of equipment. Here again, the volume of production required is such that a large part of the machinery would be idle most of the time if such a straight line arrangement were made. It has been the experience of Savage Arms Corp. that the most efficient arrangement of machinery for the kind of work and amount of production usually encountered is a group arrangement in which like operations such as milling and drilling are placed together for efficient operation but in groups of such a size that all, or the majority of operations on any particular component can be performed in one area of the shop with an amount of handling which represents an optimum, considering all of the factors of cost, machine use efficiency and convenience.

In gun making, a difficult type of shaving operation is frequently required. In commercial practice, the operation is known as slotting. During the peacetime period the Springfield Armory promoted the development of a semi-automatic hydraulic shaving machine for this purpose. The machine has table traverse from right to left 1½ in. either side of center and an in-and-out movement of 1 in. each side of center. Ram is hydraulically reciprocated. Among the numerous special features is a period of dwell at the end of the automatic feed cycle for the space of time required for the cutting tool to make three or four strokes. This finishes the cut with a true straight surface by allowing for the spring which is normal to cutting tools and machines of this type.

In the present emergency this country was indeed fortunate in having such an organization of war materiel manufacturing experts as the U. S. Ordnance Department to help industry quickly and efficiently to change over to small arms production. Furthermore, due to the intensive and continuous efforts in research and development by this group of men, America today produces combat equipment superior to that of any other country in the world.

Breaking Long Shell Steel Turnings

BREAKING long, tough shell steel turnings is being carried out very successfully by the National Steel Car Corp. of Hamilton, Ontario, in a home built breaker constructed from parts of a discarded rotary pump.

In the production of shells at National, large quantities of long, spiral shaped cuttings come from the shell lathes each day. These cuttings are so bulky that scrap dealers will accept them only if they are broken into small pieces. This breaking was found to be a very difficult task.

Studies showed that these cuttings, due to their high carbon content, could be broken when bent at a 45 deg. angle. This type of bending could be accomplished by running the material through gears, it was found.

Experiencing difficulty in obtaining a suitable commercial breaking machine, the company decided to make its own breaker. A discarded rotary pump (of the Roots-Connersville type) was obtained from a local scrap yard and converted into a breaker by making the changes illustrated in the accompanying sketches.

For the changeover, the rotors were replaced with gears. These gears were made of standard 10 in. pipe, 36 in. long with 1 x ½ x 36 in. bars welded around the outside to form the teeth. A hard surfacing bead was then applied to each tooth top to prevent excessive wear. Two 10-in. disks with 6-in. holes were welded 14 in. from each end for stiffeners. Hubs were made from 6-in. round steel 4 in. long with a keyed hole to fit the shaft which had been removed from the pump rotor. Hubs were held in place by four pieces of 2 x 4 x ½ in. mild steel welded together as shown in the drawing. The surfacing and welding was done with Hobart equipment.

The necessary hopper was constructed of ¼-in. plate arc welded together and bolted to the top of the pump housing. The breaker was mounted on an angle iron frame about 18 in. high so that broken cuttings could be shoveled out easily from underneath it, and was driven by a 7½ hp. motor, which had been geared down to between 80 and 90 r.p.m.

This machine proved so successful, according to Harry F. Graham, company engineer, that three more were made. The largest of these three additional scrap breakers has gears measuring 22 x 84 in. and stands 8 ft. high.

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THESE sketches show how National Steel Car Corp. converted a discarded rotary pump into an efficient machine for breaking long, high carbon shell steel turnings.

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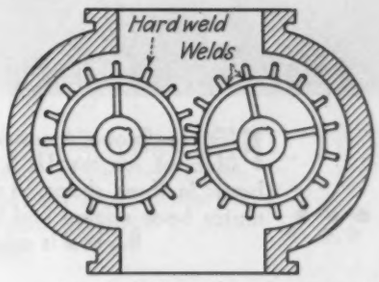
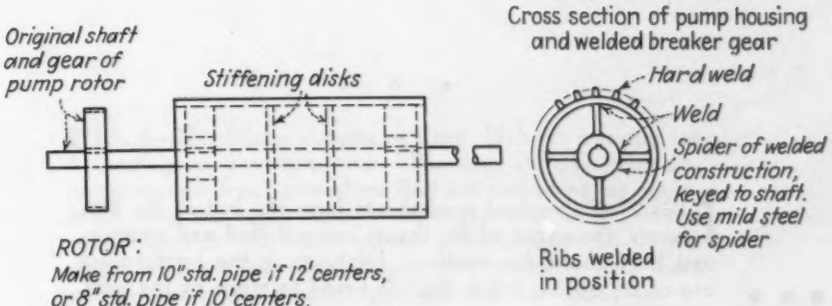


Cross section of pump housing and welded breaker gear


Original shaft and gear of pump rotor
Stiffening disks
Hard weld
Weld
Spider of welded construction, keyed to shaft. Use mild steel for spider
Ribs welded in position

ROTOR:
Make from 10"std. pipe if 12'centers, or 8"std. pipe if 10'centers.
10"size requires 20 ribs evenly spaced
12"size requires 22 ribs, evenly spaced
Ribs made from ½"x ⅞" bar stock with ⅛" hard weld applied to edges

Folding Cracks on Rolling Steel

ROLLING conditions that promoted the formation of folding cracks upon rolling flat steel bars were investigated by A. Pomp and W. Lueg, and reported by the Mitteilungen aus dem Kaiser-Wilhelm-Institut für Eisenforschung. These cracks occur when steel, which has rough edges after rolling with unrestricted lateral spread, is given further horizontal and edging passes.

Four types of steel were investigated. These steels contained: (1) carbon, 0.88 per cent; (2) carbon, 0.37 per cent; chromium, 1.05 per cent; and molybdenum, 0.17 per cent; (3) carbon, 0.13 per cent; and nickel, 3.74 per cent; and (4) carbon, 0.41 per cent; chromium, 13.6 per cent; and nickel, 0.20 per cent. The rolling temperatures ranged from 1292 to 2192 deg. F., and the surfaces were examined visually, by hot-etching and by the magnaflux method.

The surface roughness of all four steels increased with increased rolling temperature. Steel No. 1 had the smoothest surface, and was followed by steels No. 2 and No. 3. Steel No. 4, a knife-blade steel, had a smooth surface but after rolling at 1832 to 2012 deg. F. it had many surface cracks in the direction of rolling. Deep etching revealed cracks in the knife-blade steel, caused by the shear stresses set up by the metal flow toward its edges. While steel No. 3 had the greatest tendency to form cracks, there was a temperature range in which the metal flow across the section of the knife-blade steel was likely to be uneven. By cooling the strip after rolling or by coating it with a saturated borax solution before rolling, the cracks in the knife-blade steel revealed by hot etching could be prevented.

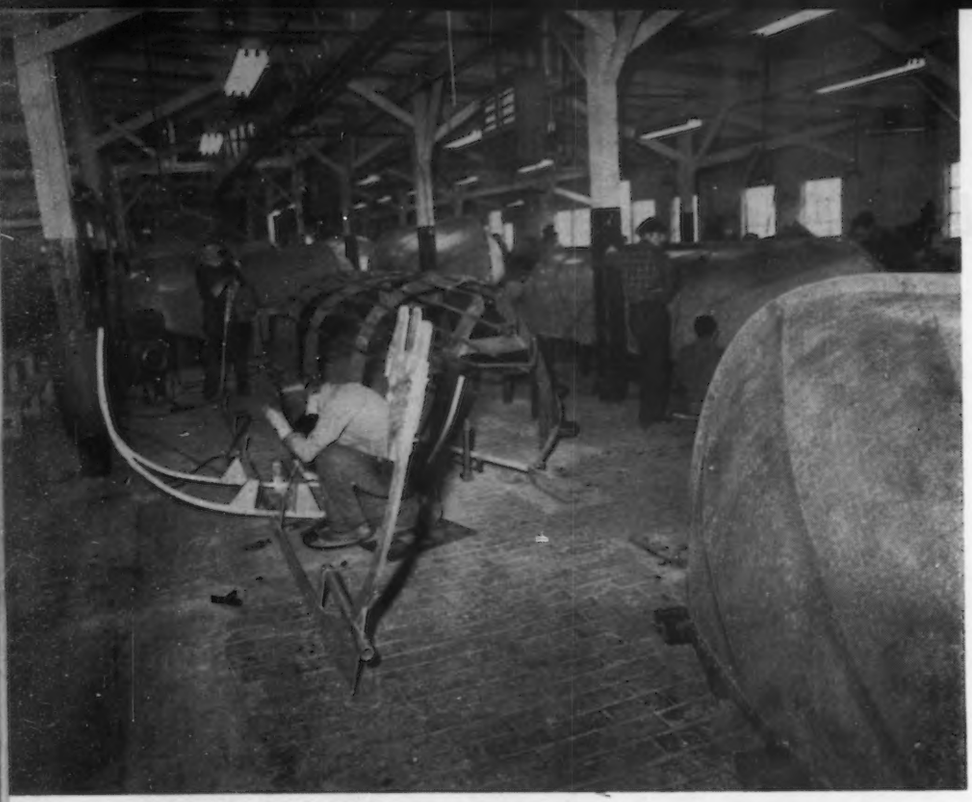


FIG. 1—Globe American Corp., designers of a standard lifeboat for the U. S. Maritime Commission, builds the boats in three shops on a production line basis. Here the motor boat engine bed is being welded to the keel before the keel is mounted on the steel form.

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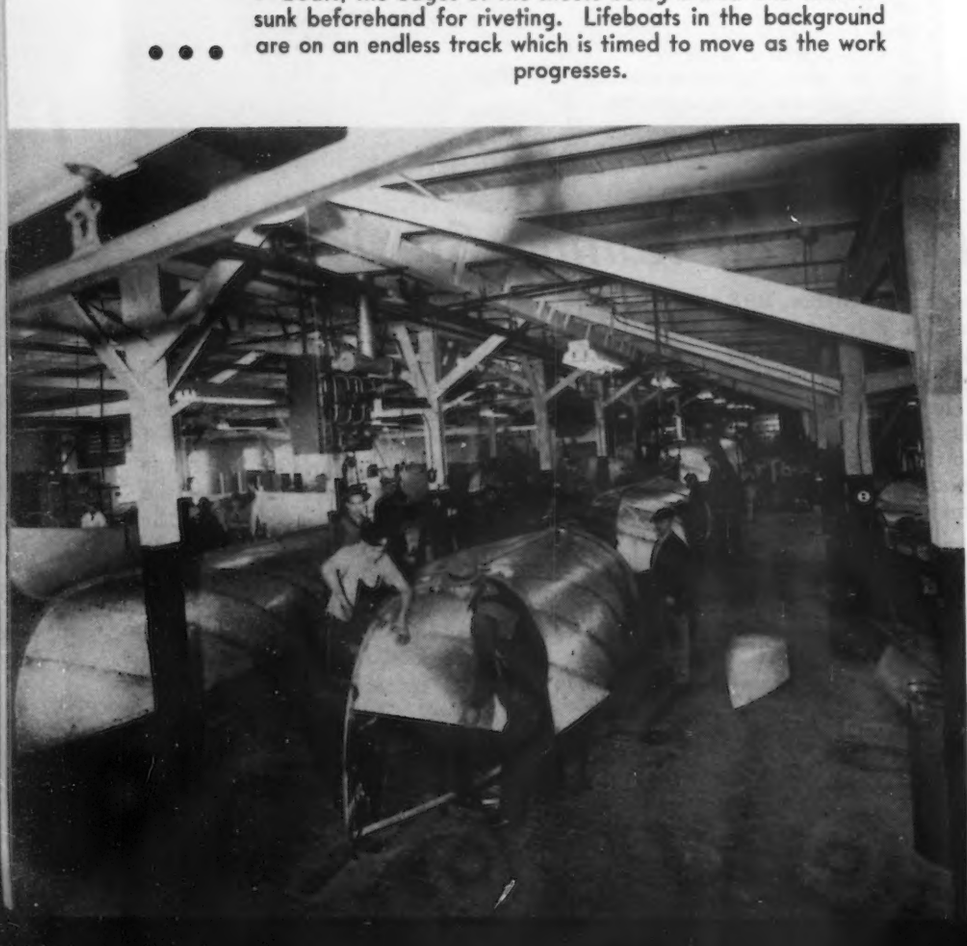
FIG. 2—Galvanized steel sheets form the hull of the lifeboats, the edges of the sheets being drilled and countersunk beforehand for riveting. Lifeboats in the background are on an endless track which is timed to move as the work progresses.



A Stove Manufacturer Builds Lifeboats

AWAY out in Kokomo, Ind., where they raise fresh water sailors and the usual quota of arm chair admirals, the Globe American Corp., a stove manufacturer, found itself faced with the prospect of either getting war contracts or going out of business. Through the far-sightedness of the executives of the 50-year-old concern, a change-over was made in plant facilities to make steel lifeboats, with which every ocean-going vessel is equipped, and in spite of the fact that the plant is 1000 miles from the Atlantic Ocean and 2000 miles from the Pacific, the U. S. Maritime Commission considered the design submitted by Globe American as fine enough to be adopted as "standard equipment" for the first 312 Liberty cargo ships now being built.

Previously, lifeboat design was not standardized, but had only to meet certain minimum specifications pertaining to size, material, air tank capacity, etc., as established by the Bureau of Marine Inspection and Navigation. Globe American, anxious to get into war

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work, employed naval architects to design a new, improved steel boat, and through their pioneering efforts obtained a contract for 1248 such ships, for the 312 cargo vessels. The 1248 lifeboats will be identical in every respect, and 744 are being built at Kokomo, 200 in New Orleans and 304 in New York.

There are four boats to each cargo ship, one of which is equipped with a built-in marine motor. The complete complement for a ship is moved from the yards to the shipyards on one railroad car, and the shipbuildings simply unload them from the car and install them on the ships. Each boat seats 31 people, providing twice the capacity of a maximum crew of each vessel.

The boats are constructed at the rate of one every 2 hr., and the three plants are now working one 8-hr. shift a day. The rate of production can be increased 150 per cent by working 24 hr. a day, high enough to provide enough lifeboat equipment for the launching of nine cargo vessels a day. In the shop, the boats are moved by a power conveyor along the production line from the time the keel is laid until the finished craft is loaded into the railroad car. The construction is entirely of steel except for wood floor boards, seats, mast, oars, and rudder, and when shipped the boats are completely equipped with chocks, releasing gear, oars, red sails, food and water, signaling and first aid equipment, canvas covers, hood, and weather cloths.

While these production methods are new in the boat industry, this is a good example of how American manufacturers are meeting the national emergency. Likewise, in other places remote from the scene in which the material will see service, other manufacturers are building war equipment and other material needed to carry the war to the enemy.

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FIG. 3—Thwart brackets (seats), stretcher plates (foot boards) and grab rails are assembled on the boats at this riveting platform. The grab rails on the boats in the left background are for passengers in case the boat is overturned in the water.

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FIG. 4—This Globe American Corp. lifeboat is ready for loading on a railroad car. The four storage compartments contain food, provisions, first aid and signaling equipment, and the water cask is under the rear deck. Hood rods, fitted on the boat, permit it to be covered with a waterproof canvas. Four boats, one powered and three not powered, are loaded on a railroad car ready for installation and completely equipped for abandoning ship.

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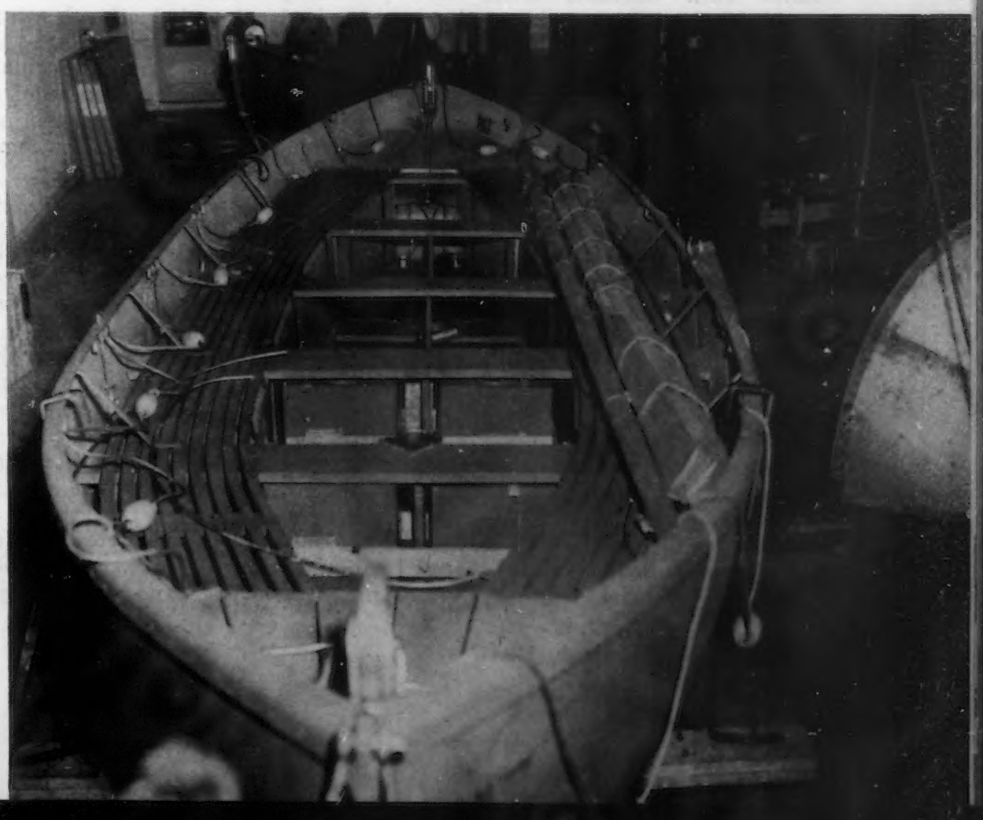


Heat Treating Tips

By G. B. BERLIEN
Lindberg Steel Treating Co., Chicago

THE heat treater's job in the war effort is just as important as the task of the tool designer or the tool maker, since the efforts of the latter two are wasted unless the heat treater does his work well.

The first factor of delay in producing a tool or machine part presents itself when the toolmaker or the machinist chooses the steel to make the part. Often tools are made, quite accidentally, from steels other than that called for in the print, and in these days of rush orders this situation is rapidly growing worse. Nine out of 10 times such mistakes could be avoided by a simple spark test that requires just a few seconds. It is not necessary to be an expert to catch the mistake before hours of labor have been wasted. Small pieces of bar-ends of which the workman is certain of the type of steel should be stamped and conveniently stocked. Using one of these samples and comparing its spark with that of each bar to be used will save no end of time, material and strained employer-employee relations.

Proper fileting of corners and removal of bar stock decarburization have been stressed by almost every writer on the subject, and little need be said as to the importance of these details.

When the tool or machine part is ready for the heat treating, there are other essential cautions that must be observed. Suppose, for example, that a part made of SAE 1020 steel is to be carburized and hardened. Here, it must be remembered that, if the case depth is such that some sections are cased completely through, a high-carbon tool steel that commands as much respect as any straight-carbon tool steel is obtained. If the lighter sections do not require hardness, they should be left uncarburized by means of a suitable non-case protection. Often the case depth can be controlled to such an extent that a case is left only in the dangerous areas. If this is not advisable, however, it is often possible to quench only the heavier sections. Selective reheating of safe sections by means of a lead pot or induction heating will give satisfactory results.

However, if the part is irregular in section and all areas require hardness, one suitable means of hardening is to repack in compound, heat to 1500 to 1550 deg. F., and oil quench the part from the pack. While this method will not produce a surface with Rockwell values as high as if the part were brine quenched, it will give a good wearing, file hard surface.

Large carburized parts, difficult to reheat in an open fire without forming soft spots, can be reheated in a compound of brine quenched from the pack. This will avoid scale, with the resulting spotty hardness, during the reheating.

If carburizing is carried out in a liquid bath at, for example, 1550 deg. F., warpage and size change can be avoided by transferring to a low temperature bath of from 1350 to 1400 deg F., before quenching. The importance of normalizing after carburizing on all SAE grades cannot be overstressed. It is essential to safe straightening of the part after hardening.

SAE 1045 steel is being used to a greater extent at present since higher alloyed SAE steels are more difficult to obtain. While SAE 1045 is not a high carbon steel, it can cause much difficulty in hardening. Warpage and cracking must be carefully considered.

Gear Hardening

Spiral bevel gears made of higher alloyed, medium carbon, SAE steels will hold their shape better if preheated to from 1000 to 1200 deg F., and then supported above the furnace hearth in hardening. They can be removed from the quench while hot and pressed between plates made to fit the web and teeth for final straightening touches.

Carbon and oil hardening tool steels should be preheated before hardening to aid in size maintenance. Hardening as close to the critical temperature as possible will minimize excessive movement in hardening. Quenching oil hardening tool steels at the AR_3 point instead of the AC_3 point will often help to maintain close tolerances of 0.001 to 0.002 in. This can be done by first heating to the proper hardening heat, then, after a sufficient soak, removing the tool from the fire and allowing the temperature

to drop 50 or 75 deg. before oil quenching. Large, heavy sections to be oil hardened should be quenched with a stream of oil washing the entire part. This will give better results than any amount of stirring with a tong.

In finish grinding of high speed broaches and reamers, much time can be saved by careful straightening from the quench. Care must be given to leave enough stock so that undue chances need not be taken in the straightening operation. This may vary, depending upon plant facilities, but with proper cooperation between the toolmaker and the heat treater, a minimum amount can be established as best practice.

Double drawing may greatly increase the cutting qualities of high speed tools. Double drawing allows the cutter to reach room temperature after the first drawing cycle, and then to be reheated to the same temperature or slightly lower, soaked and slow cooled. Many users of high speed tools have been able to increase tool life by slight nitriding or high speed case treatment after the finish grinding.

The life of springs is so closely tied up with surface decarburization and, as this decarburization cannot be removed from springs as it can with tools and dies, every consideration should be given to furnace atmosphere in hardening.

Die casting dies, inserts, and plungers must be free from any foreign material such as aluminum and zinc. Otherwise, pitting will result, necessitating hours of tedious and costly hand polishing or even die replacement. Carburization must be avoided or heat checking will result.

From the standpoint of the heat treating room, this covers a few of the points that will add to tool life. The next step is leaving the tool or machine part with a hardness that will insure long life and service to the user. The following list of proper Rockwell hardnesses may require some slight adjustments to fit individual requirements, but on the whole are excellent for the types of tools shown.

Type of Tool	Rockwell C Hardness
Form tools	
Circular and dovetail	63-5
End mills	63-5
Drills	62-4
Tool holder bits	64-6
Cut-off tools	63-5
Broaches	
Burnishing	64-6
Cutting	62-3
Boring tools	63-5
Router bits	
Metal	62-4
Wood	60-61
Screw driver blades	54-6
Hot rivet sets	48-50
Cold rivet sets	58-60
Hot punches	
Blanking	50-52
Piercing	45-47
Perforating punches	62-3
Blanking punches	58-60
Blanking dies	61-62
Laminating dies	63-4
Shear blades	
Hot work	43-5
Heavy cold work	52-4
Slight cold work	56-8
Cold chisels	56
Hot chisels	50-52
Hot trimmer dies	53-55
Cold trimmer dies	58-60
Brass forging dies	46-7
Hot extrusion dies	44-46
Hot heading dies	45-50
Shell mandrels	38-40
Heavy springs	42-4
Medium springs	46-8
Light springs	48-50
Drifts	55-56
Wire draw dies	64-6
Thread rolling dies	62-3
Shaving dies	62-4
Nail dies	58-60
Coining dies	60-62
Die casting dies	44-46
Gripper dies	50-52
Gages	63-5
Arbors	48-50
Mandrels	58-60
Hobs	
For sinking	58-9
For gear cutting	63-4
Mold parts	55-58
Mail points	
Shanks	60-63
Points	50-54
Knurling tools	63-4
Woodworking knives	59-61
Chuck jaws	55-58
Bushings	62-4
Cams	62-4
Centers	63-5
Chasers	60-62
Counterbores	63-4
Countersinks	63-4
Dowel pins	62-4
Spinning tools	64-6
Stamps	60-62
Taps	60-62
Wrenches	40-42

Influences of Mold Friction on Tearing in Castings

A REPORT by J. H. Andrew and H. T. Protheroe to the British Iron and Steel Institute discusses an investigation on the influence of mold friction on tearing in castings. From tests made, it was concluded that hot tearing is due rather to the resistance offered to contraction by the bulk of the sand than to the nature of the sand itself. In stripping steel castings from the box, it was observed that a thin layer of burned sand existed between the face of the casting and the main body of the sand. This layer is very crumbly and if the original refractoriness was sufficient, is easily removed from the casting.

However, after being submitted to molten steel temperatures, there is no strength in this sand. It is not likely, therefore, that there is any resistance offered to the contractional movement of the casting. However, the friction between molten metal and the sand may increase with an increase in the coarseness of the sand. This was observed when casting at the same temperature in different sands.

It is believed that the temperature at the crucial moment during contraction will decide where the casting tears. In every test carried out, this was near the runner, that is, in the hottest region. Given temperature uniformity, the bar is as likely to crack near the riser as near the runner. The degree of purity might influence the location of the tear in this case.

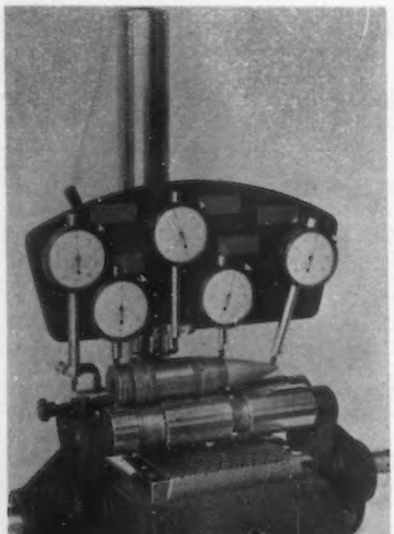
With regard to casting temperature, the only deduction possible from the varied number of casting temperatures employed is that tearing occurs some time after solidification, probably soon after. Steel at these temperatures, being weak, contract quicker at high than at low temperatures. These facts indicate when considered together, that tearing occurs somewhere near the solidification temperature. When one runner is set at a sloping angle, the authors show that hot tearing will not occur.

New Equipment . . .

Small Tools and Gages

Many new small tools, gages, tool accessories, and other useful items around a shop or plant are described in this week's section on new equipment.

A NEW Model 100 B-15 shell gage for checking 37-mm. anti-aircraft shells has been designed by *Federal Products Corp.*, Providence. The gage not only determines whether the shell dimensions meet requirements, but also shows how far out imperfect shells may be, thus saving parts for refinishing. The shell rests on roller V-blocks which can be rotated to compensate for wear. The gage is entirely mechanical and independent of electrical or air line connections, and is made in the same design for any size shells.

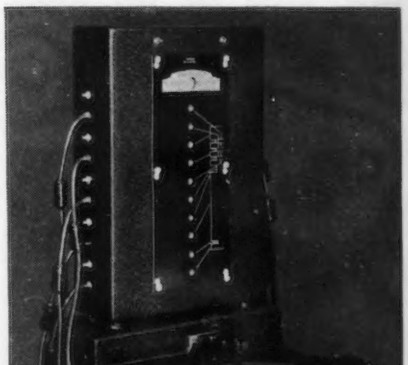


Shell Concentricity Gage

AN improved shell concentricity gage for tracer or fuse holes, rotating bands, bourrelet, and ogive diameters has been developed by *Federal Products Corp.*, Providence. Model 205 B-84, built for 75-mm. semi-armor piercing shot, is typical of the indicator gages built for shells of various sizes. The shell is located in a V-block on the body diameter, with which other diameters must be concentric. Points at which the projectile contacts the V-block are faced with tungsten carbide to prevent wear. Shells up to about 14 lb. can be rotated manually with ease. Each indicator has a pantograph spring unit which protects the indicator and contributes to the accuracy and furnishes an adjustment for contact with the shell. These gages are fast and entirely mechanical. The gage is often used in conjunction with a shell diameter gage which checks four diameters on a shell, independently of each other. Each indicator and its opposite anvil which contacts the shell is a separate and integral unit, mounted on flat springs allowing independent positioning.

Aircraft Piston Gage

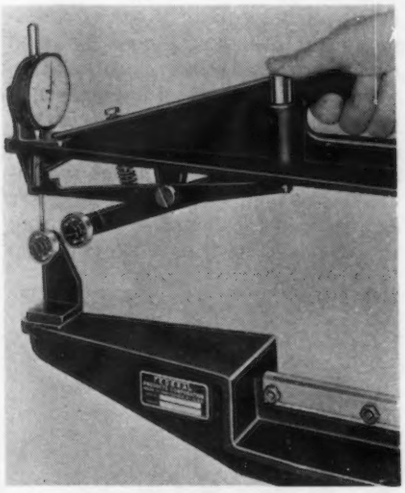
A MULTICHEK for checking simultaneously 10 dimensions of an aircraft piston was developed by the *Sheffield Corp.*, Dayton, Ohio. The gage, greatly increasing the speed and economy of piston inspection, has 10 gaging heads, three behind and seven in front of the piston. The front gaging units check two oil ring groove diameters, the o.d. at the bottom skirt, piston, upper oil ring grooves, at and above the compression ring grooves. The three rear gaging heads check the compression ring groove widths. Each gaging unit operates independently of the others and has its own signal light on the panel. A red light indicates the dimension is undersize, green shows oversize, and amber indicates the dimension is within tolerance. All lights connect with a master light that shows red when any dimension is violated, but stays off when all lights are amber. The piston is placed on the loading rails and pushed between two guide anvils. Multicheks have also been developed for magazine fuses, fuse percussion caps, primer heads, and numerous size shells and cartridge cases.



Bomb Wall Thickness Gage

A PORTABLE thickness gage for checking the wall thicknesses of 500-lb. demolition bombs, model K P-96, has been developed by *Federal Products Corp.* The roller bearing lower anvil and the roller bearing pressure unit on the upper arm facilitate handling of the gage. The upper roller unit has sufficient pressure to hold lower roller anvil firmly in contact with the inside surface of the bomb. The tungsten carbide indicator contact point is raised by pressing the plunger in front of the foremost

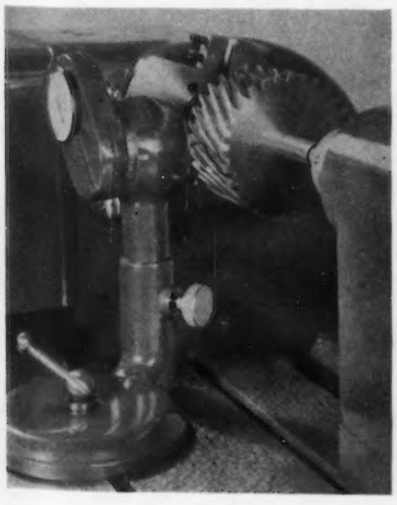
hand grip. The shell is guided up to the locating stop by the interchangeable steel slide along the



lower section. The depth of the throat is 33.3 in., and the gage is graduated in 0.001 in. It is made in sizes to suit requirements.

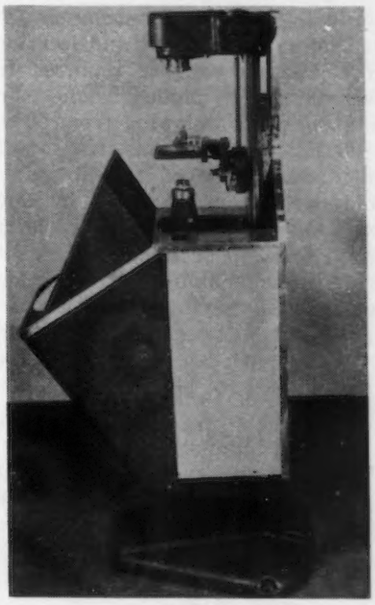
Spiral Gear Gage

DESIGNED to check right and left hand spiral gear leads from zero to infinity, a new Sine-Line checking machine, model 1205, has been added to the line of the *Michigan Tool Co.*, Detroit. The new design eliminates master rolls, disks or lead screws in checking gears, and can be used with the Michigan gear checking recorder. Gear size capacity of the standard machine is 0 to 18 in. diameter, with 24 in. between centers, and bed lengths of 36 and 48 in. are available. The machine is horizontal and all operating mechanism is completely enclosed. The sine-bar table when moved back and forth rotates the spindle on which the gear is mounted. When the sine-bar is set parallel to the axis of the machine, gears of infinite lead can be checked, since longitudinal movement of the indicator table produces no movement of the transverse sine-bar table. For any angular position of the sine-bar, movement of one table produces corresponding movement of the other and of the spindle. Friction rolls provide two ratios of the spindle to the sine-bar table. Bar setting is established either by micrometer or gage blocks placed between the end of the bar and special 1-in. diameter locating pins.



Optical Comparator

THE new Portman optical comparator, developed by *Portman Machine Tool Co.*, Mt. Vernon, N. Y., permits work to be inspected or compared by simply being placed



on the work rest member of the stage, eliminating numerous staging or holding fixtures. All ways on moving parts are dovetailed. The optical system permits ready change of image magnifications, and the coordinate stage unit includes dial type indicators reading in 0.001 in. for rapid visual detection of object errors. The reflected image is projected on both clear and ground glass screens. The operation is sufficiently simple that inexperienced operators may be employed for most critical inspections. Standard magnifications available range from 10 to 100.

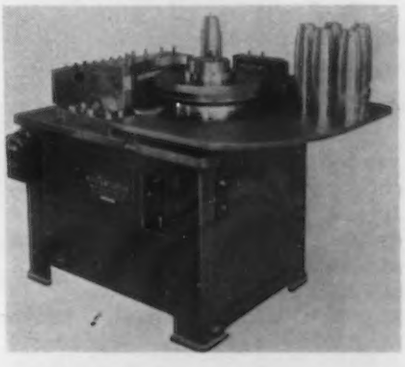
Pitch Diameter Gage

THE success of this pitch diameter gage, model 45 B-80, is in the fact that the two lower ball locating points are free to

adjust themselves laterally, independently of any lead variation. This pitch gage, built by *Federal Products Corp.*, Providence, checks threads within 0.0002 in. The backstop is adjustable vertically, laterally, and angularly. Pitch diameters up to 2 in., and pitches from 10 through 80 can be checked. The gage is also suited to British threads, and threads coarser than 10 per in. require separate sets of ball anvils. Results on this gage are equal to those obtained by the 3-wire method of measuring used to check threaded plug gage and precision screw thread accuracy.

Shell Knurler

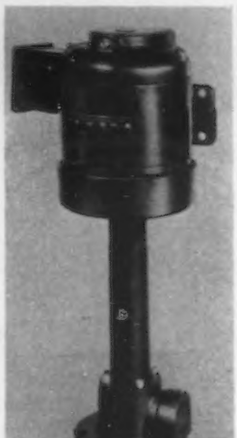
A NEW power operated, dial feed, rapid production combination machine for knurling or scoring the band seat and in the same operation marking inscriptions permanently into the periphery of high explosive shells has been developed by the *Noble & Westbrook Mfg. Co.*, East Hartford, Conn. The scoring consists of a



series of straight line scores in the band seat and the marking consists of the shell designation, lot number, date, etc. The machine will mark 75, 90 and 105 mm. shells and its construction provides for variations in diameter of shells within the allowable tolerances. Production ranges from 10 to 15 shells per min., depending upon plant handling facilities.

Coolant Pump

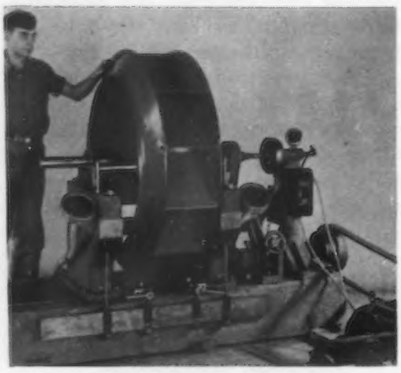
A NEW series of coolant pumps, designated as Eastern model No. 17, built by *Eastern Engineering Co.*, New Haven, Conn., has an



open impeller that allows small chips or grit to pass through, has no stuffing box to leak or consume power, is small for confined space installations, and requires no priming. It is designed for use on lathes, shapers, millers, drills, grinding machines and other tools requiring a steady stream of coolant or cutting oil. The pump is of cast iron construction and no metal to metal contacts exist below the liquid level, making possible continuous and dependable handling of non-lubricating liquids. Maximum pressure is 6 lb. per sq. in., and delivery is 17 gal. per min.

Balancing Machines

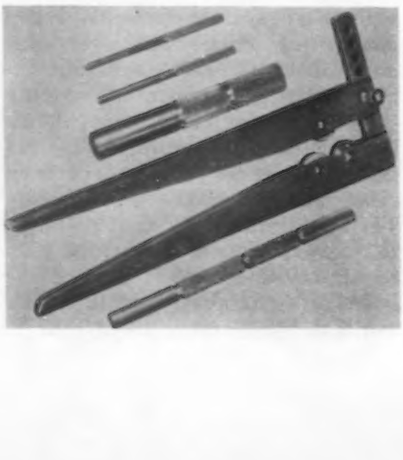
THE *Globe Tool & Engineering Co.*, Dayton, Ohio, has developed three new balancing machines: The NE-90 heavy type, special Globe, and NE-48 Globe dynamic units. Model NE-90 is one of a line of a series of models that accommodates a range of ¾ to 25,000 lb., with a commercial range of 200 to 10,000 lb. Mechanical separation of correction planes by means of the Equipose feature, and accurate measurement of each quantity of required correction by Micro-Indicators make this ma-



chine desirable for production balancing. The special Globe machines are used in production lines for analyzing static and dynamic balance in generator armatures, and will hand more than 300 armatures per hr. The NE-48 machines will determine the amount and location of correction weights required in overcoming dynamic balance in rotating parts weighing from 50 to 1500 lb., and are sensitive to 0.2 oz.-in. of unbalance. It will handle shaft sizes from 1½ to 3¾ in., and extra saddle adapters permit shafts up to 6 in. to be handled. Heads are adjustable along the bed to accommodate varying shaft lengths up to 4 ft. between bearings, and any bed length can be furnished for greater distance between bearings.

Hand Knurler

THIS new hand knurler, using three knurl designs, will handle round stock from 5/32 to 2 in. in diameter. It can be used on work held in a lathe chuck as well as in a drill press or even a vise. The tool is manufactured by *Pacific Tool & Supply Co.*, 344 North Vermont Avenue, Los Angeles.



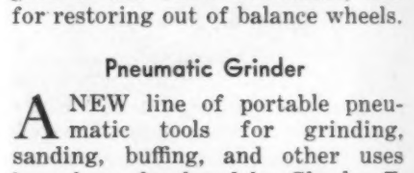
Grinding Wheel Dresser

A NEW abrasive wheel type grinding wheel dresser that is said to give a cutting and truing effect almost equal to that of a diamond has been introduced by *Ideal Commutator Dresser Co.*, Sycamore, Ill. The wheel is held in a metal housing which deflects the grindings away from the operator, and the large handle makes it convenient to hold and use. The dresser can be used for cleaning and truing the wheel as well as truing cut-up

and uneven sides, dressing out deep grooves and out-of-roundness, and for restoring out of balance wheels.

Pneumatic Grinder

A NEW line of portable pneumatic tools for grinding, sanding, buffing, and other uses have been developed by *Charles F. Overly Co.*, Cleveland, incorporat-



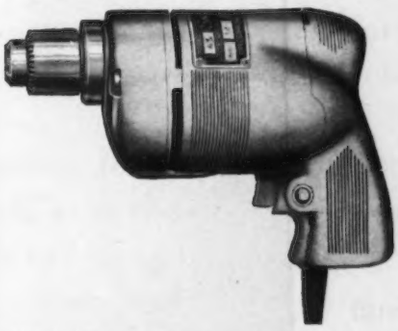
ing a rotor-centric type motor with four blades, chrome nickel steel rotor and shaft in one piece, controlled metal seep lubrication system, linen base Phenolite blades, and strong aluminum alloy control head, front head and handles.

Cold Saws

AN improvement in its line of segmental cold saws was recently announced by *E. C. Atkins & Co.*, Indianapolis. The improvement, known as relief grinding, consists of an additional grind along the side of each tooth, ground at an angle slightly greater than the tooth angle. This relief reduces the line of friction on the side of teeth and helps carry cooling or cutting compound back into the cut. Furthermore, relief grinding aids in eliminating wander in the cut.

Lightweight Drill

SKILDRILL is a new ¼-in. drill made by *Skilsaw, Inc.*, Chicago, that weighs 2¾ lb., and is 6⅝ in. long. It is especially adaptable to production work in aircraft, tank, automobiles, and other industrial



fabricating operations. It has a no-load speed of 1800 r.p.m., and a full-load speed of 1050 r.p.m. Drilling capacity in steel is ¼ in.

Precision Grinding Wheel

THE new Radiac Por-Os-Way precision grinding wheel, produced by a new patented process, is said to increase production per man per machine from two to five times, grinding 100 to 400 per cent faster. Instead of being sandy and compact, the wheel composition is stringy and porous, resembling a sponge. Air cells allow air to keep grinding contact cool, but the wheel is claimed to be hard, tough, and holds the corner with very little wheel dressing. *A. P. DeSanno & Son., Inc.*, Phoenixville, Pa., makes this wheel, which will grind hard alloys, copper, aluminum and other materials.

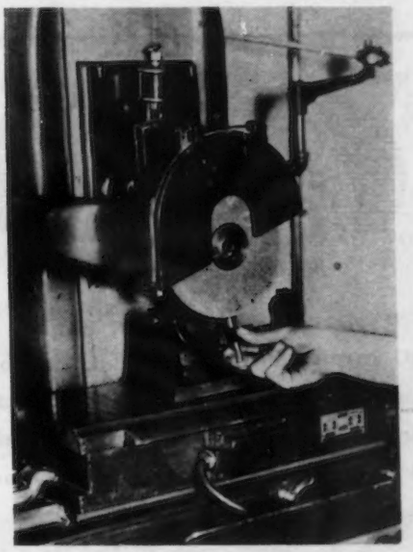
Light Pneumatic Grinder

ONLY 6¼ in. long, with a speed of 17,000 r.p.m. for wheels up to 2 in., the new model 22BGS grinder, built by *Aro Equipment Corp.*, Bryan, Ohio, has been designed to meet industry's demand

for a compact, light, one-hand operated pneumatic grinder. It is equipped with large precision ball bearings and is available with either lever or button throttle, spindle extension, and collets of various sizes.

Radius Dresser

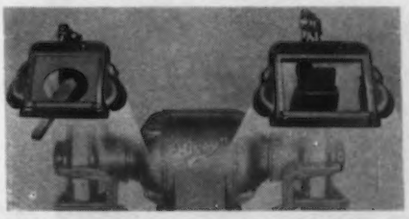
THE "Little Wonder" radius dresser, designed to speed up and simplify dressing grinding wheels for various types of grind-



ing work, has been introduced by *George Scherr Co., Inc.*, 128 Lafayette Street, New York. The device is used with a diamond tool to dress wheels preparatory to grinding forming tools, fillets, etc. It will dress either convex or concave radii from 0 to 1 in. and can be set with a regular 1 in. micrometer, depth micrometer, or height gage.

Grinding Shields

TWO new types of illuminated eye shields have been designed by the *Hisey-Wolf Machine Co.*, Cincinnati. That on the left has a



4½ in. two-power magnifying lens with 10 in. focal length. A plain glass shield under the lens prevents pitting. The shield to the right has clear laminated, shatterproof glass, 9x7 in. This latter style is recommended for wheels 12 in. and larger.

Aircraft Drill

AN extremely light but heavy duty electric drill, the U14FS series, ¼-in. aircraft drill was recently announced by the *Independent Pneumatic Tool Co.*, Chicago. The tool is useful for operation in very limited space and in difficult positions. It has power reserve, rugged construction, and stability necessary for high speed production. The tools are available in three different speeds, have side switch style handle for continuous or intermittent drilling, and are extremely easy to control.

Floating Chuck

A NEW floating chuck designed to operate in a horizontal position in automatic screw machines and turret lathes has been devel-

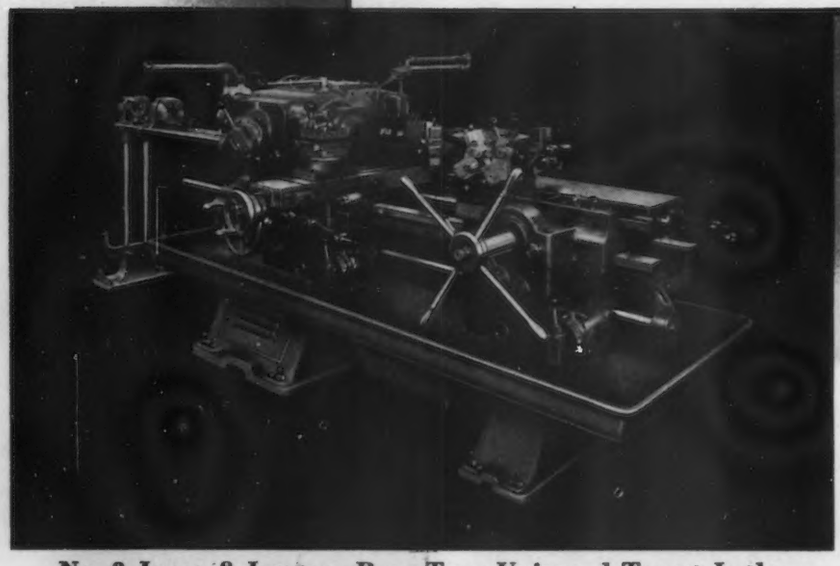
oped by *Universal Engineering Co.*, Frankenmuth, Mich. Adjustments permit the weight of various tools to be counterbalanced and thus permit increased feeds without danger of marring or causing bell mouthed conditions. Spring pressure is from four different directions and can be adjusted. The chucks use a ball bearing drive for both lateral movement and thrust, and the chuck operates in the same vertical plane at all times, eliminating dogtail motion.

Chuck Rectifiers

THE Doall rectifier made by *Savage Tool Co.*, Savage, Minn., is designed for plants where a.c. must be transformed into d.c. for operation of electro-magnetic chucks. There are no moving parts to wear out, and the units are packed in a self-contained welded steel case. It is operated from a toggle switch, contains a built-in pilot light, and is completely fused. It will operate any electro-magnetic chuck from 6 x 18 in. to 8 x 24 in. in size.

Mr. Howe was ahead of hi

WHO invented the turret lathe? This still seems to be an open question. Prior to 1850 its principles were understood but had been used only in occasional special machines built by manufacturers for their own shops. Frederick W. Howe brought the turret lathe idea to Vermont in 1847. There Howe, Lawrence, Stone and Alvord built the first turret lathe for general sale. This pioneer model was built in the shop from which Jones & Lamson Machine Company is a direct successor.

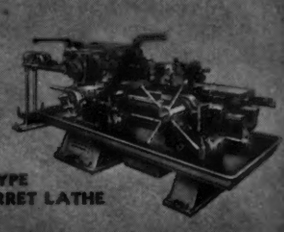


No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment.

JONES &

AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS



RAM TYPE UNIVERSAL TURRET LATHE

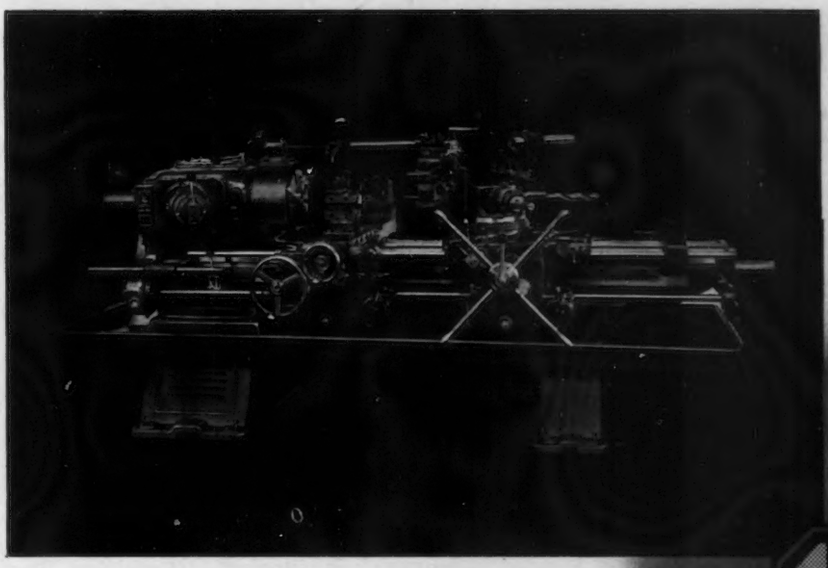
his time - and so are you!

FREDERICK W. HOWE was ahead of his time, and so are you, when your plant is equipped with modern Jones & Lamson Turret Lathes.

Modern Jones & Lamson Turret Lathes are ahead of the times in many ways. Into these new machines have been built ample reserves of speed, rigidity and useful power to enable you to take full advantage of every improvement in hard alloy cutting tools — available today *or liable to become available in the immediate future.*

Thus Jones & Lamson Turret Lathes can help you meet the urgent demands of immediate wartime production and still be available to help you in the hard years that lie ahead.

Among other reasons, this is why it pays to put your production problems up to Jones & Lamson. Write today, inclosing blueprints and ask for illustrated catalogs.



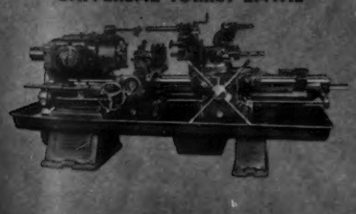
7A Jones & Lamson Saddle Type Universal Turret Lathe with standard chucking equipment.

S & LAMSON
MACHINE COMPANY
Springfield, Vermont, U. S. A.

PROFIT PRODUCING
MACHINE TOOLS

MANUFACTURERS OF: RAM & SADDLE TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . AUTOMATIC OPENING THREADING DIES AND CHASERS

SADDLE TYPE
UNIVERSAL TURRET LATHE

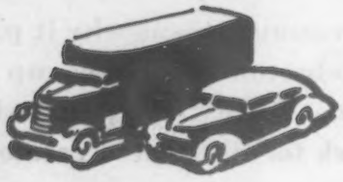


AUTOMATIC OPENING
DIE HEADS

FAY AUTOMATIC LATHES

Assembly Line . . .

• Packard employee conversion to war jobs 100 per cent complete . . . Salesmen take production jobs . . . Aircraft, automotive industries cooperating close, Nash-Kelvinator president finds . . . Low point in Detroit employment, as result of war changeover, believed past.



DETROIT—Two more of the independents in the automobile industry are examined here this week to give an indication of the extent of their conversion to war work.

The first of these is Packard, which began its shift into the defense program even before Willys (whose progress was reported here last week). Alvan Macauley, chairman of the Packard board, revealed last week that the Packard pay roll now is about 16 per cent higher than it was at Packard's employment peak in 1937. The number of employees now is 17,904 compared with 15,542 at that time.

"Less than 2000 of these workers are on clean-up jobs in connection with winding up parts building for motor car servicing and the like," Macauley said. "Within a few weeks most of these men will also be shifted to war work. Thus, in substance, Packard employee-conversion to war production is now practically 100 per cent. This is made possible by Packard activity launched as far back as two years in building marine engines for the Navy and, later, Rolls Royce aircraft engines for the Army."

Packard is engaged now in clearing out the remainder of its former auto plant facilities and is constantly adding new workmen. It is anticipated that it will reach its goal of 25,000 workers on war work before this year ends.

In contrast to these figures Packard's activity in the previous World War required the employment of only 11,273 workers, so the company's employees now total nearly 60 per cent more than the previous war peak.

At Packard also is illustrated another phase of the conversion of the industry—the conversion of such diversified talents as automobile salesmanship into productive fields of war work. Typical cases cited by Mr. Macauley are those of the star salesman from Pittsburgh, now employed in the aircraft inspection records department, a former district manager for the Packard distributer in Indianapolis who is now an inspector in the Rolls Royce aircraft assembly division, and a former Chicago sales promotion man who is an aircraft assembly inspector in the Rolls Royce operation. As far back as last December, Packard wrote to all its field personnel urging that they seek employment in defense plants and offering to place them in Packard war work if local facilities were unable to absorb them. Similarly, the company's war operations have also employed former automobile mechanics who previously worked in the field on Packard cars.

ANOTHER independent reporting on its operations is Nash-Kelvinator Corp. whose president, George W. Mason, has just completed a tour of aircraft factories on both coasts with W. F. Armstrong, executive vice president. They studied production in airplane and propeller plants because Nash-Kelvinator is engaged in turning out these products, or is currently tooling up for them.

Mason praised the spirit of cooperation between the aircraft and automotive industries and declared that the public can look for completion of war plane schedules ahead of time.

"The aircraft people are showing us how to do aircraft work and are even training key men for us in their plants," Mason said. "For example, our training program for the Lansing (Mich.) propeller plant where three-blade hydromatic propellers are now being turned out for bombing planes was started months earlier than it could have been if it were not for the co-operation of the men in the aircraft industry. United Aircraft Corp. took a number of our key men into their plants and trained them to make Hamilton standard propellers while we were equipping the Lansing plant. When we started operations in Michigan in January, these men formed the basis of our manufacturing program. They quickly trained other men right on our own production line."

A series of job instructor institutes in Michigan to assist manufacturers in solving training and labor shortage problems will be held in 10 cities during the next three months by the Training Within Industry program of WPB, according to M. M. Olander, district representative. Two such institutes are in session in Detroit with production engineers and personnel experts from more than three dozen war plants taking part. This work in Detroit is under direction of William Conover, a personnel and production man for U. S. Steel Corp. who is on leave of absence to assist WPB.

The goal is the improvement of skill among at least 37,000 Michigan war plant workers by next July. The leaders trained in these courses will pass their instructions along in their own shops.

Institute centers, and surrounding cities from which they will draw industrial training leaders, include Iron Mountain (Ironwood, Escanaba, Menominee and Marquette); Cheyboygan (Alpena, Rogers City, Petoskey and Boyne City); Ludington (Manistee, Frankfort, Travers City and Cadillac); Grand Rapids (Muskegon, Grand Haven, Holland, Newaygo, Greenville, Ionia and Belding); Battle Creek (Kalamazoo, Hastings, Marshall and Charlotte); Niles (Benton Harbor, St. Joseph, South Haven, Buchanan and Dowagiac); Sturgis (White Pigeon, Three Rivers and Coldwater); Jackson (Albion, Hillsdale and Adrian); Flint (Saginaw, Bay City, Midland, Mt. Pleasant, Alma, Lansing, and Port Huron); Detroit (all industries in southeastern Michigan).

THE unemployment situation in the automobile industry has proved to be less severe than was anticipated. An example is cited

SURE THEY'RE HEAVY!

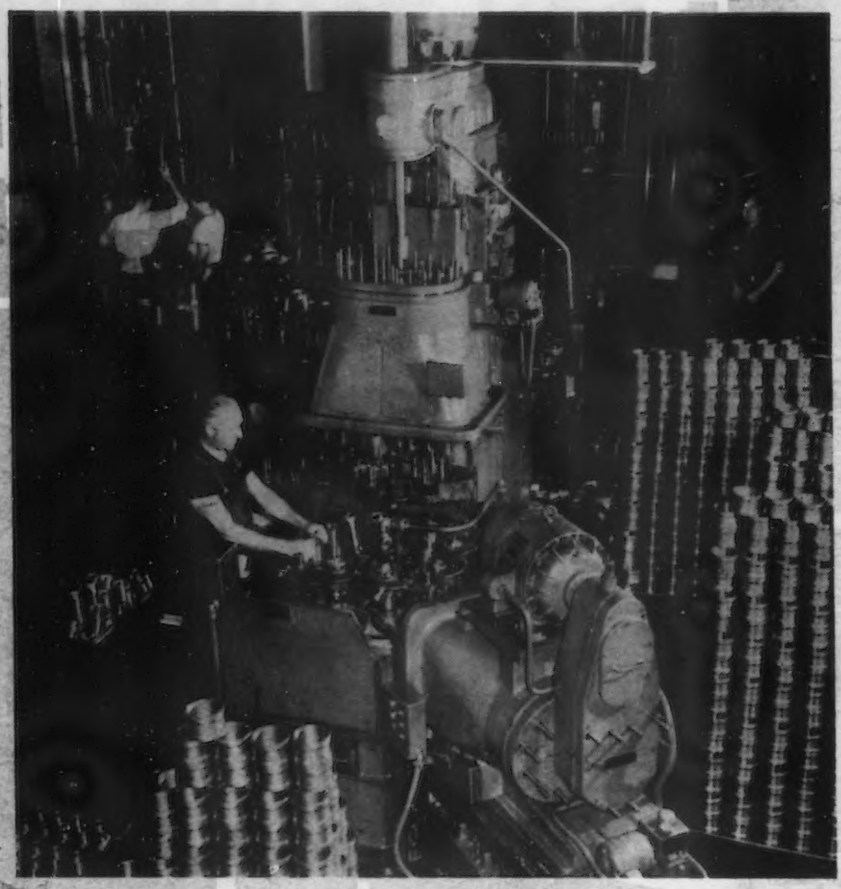
But one workman can feed these parts all day if he merely has to swing them on and off the horizontal chucks of a Mult-Au-Matic. Machine operators get tired, like everybody else. But they don't get nearly as tired when their work is made as easy as possible — which is why they do faster, better work on Mult-Au-Matics because when chucking they lay the work down rather than hanging it up.

ONLY MULT-AU-MATIC HAS *ALL* THESE FEATURES

1. 8 Stations
2. Independent Speeds and Feeds at each Station
3. Horizontal Chucks
4. Minimum Floor Space
5. Automatic Operation
6. Easy Changeover
7. Continuous Flow Lubrication
8. Interlocking Safety Devices
9. Easy Tooling

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT



ONE YEAR FOR CONVERSIGN: This G-M Rochester Products Division plant at Rochester, N. Y., has attained 100 per cent defense production. The plant is purchasing parts and materials from more than 200 firms in 100 cities. Its multiple drill above drills 20 holes in generator and starting motor yokes on frames, for aircraft and tanks.

Wide World Photo

FORD BOMBER PLANT: This is a view of the tool and die department of the new Ford bomber plant at Willow Run, Mich. Sub-assembly work for bombers will also be done here, and the fabricated parts shipped to bomber assembly plants that are nearing completion in Tulsa and Fort Worth, Tex. When this $60,000,000 factory attains peak production, it is expected to employ between 80,000 and 100,000 people.

by General Motors which had estimated that on March 1 it would have only about 143,000 employees on its pay rolls. Instead, it had more than 161,000 hourly wage employees, according to C. E. Wilson, president. He points out that the corresponding figure for the average employment for the whole year 1939 was 152,000, 10,000 less than GM now has. In addition, in February these employees averaged 44 hours per week, while the yearly average in 1939 was only 35 hours.

The low point in employment appears to have been passed and each week is expected to mark some substantial gain back to peak employment. By this fall, General Motors plant will have more people at work than ever before, even in peace times.

Of the 90 factories and producing units of General Motors, and approximately 65,000,000 sq. ft. of floor space, 86 of the plants are already engaged in the war program, either as producers or in various stages or rearrangement and retooling, Wilson has revealed.

"War work will be found for the remaining four or they will be sold or leased to the government or other contractors," Wilson declared.

Referring to the "Assembly Line" of Feb. 19, American Car and Foundry Co. calls attention to a statement about the first standardized tank design and the first attempt at mass-production of tanks, and points out that ACF was more than a year ahead in this effort. It is, of course, a matter of record that ACF did engage in tank manufacture very early in the defense program and had produced several thousand tanks of a standardized design before Chrysler turned out its first experimental model at Detroit. The Chrysler-built tank was the 28-ton M-3 model, and the ACF-built tank was a 12½-ton armored vehicle officially known as the M-3 light tank and was in production in 1939.

Truscon Profit $1,767,730

• • • **Truscon Steel Co.,** subsidiary of Republic Steel Corp., earned a net profit for 1941 of $1,767,730 after all deductions, including provision for federal income taxes, according to the company's annual report made public today. This compares with a profit of $1,330,389 for 1940.

AS BOMBERS LAY HELL-BORN "EGGS"

OUR WAR PRODUCTION IS GAINING PRECIOUS HOURS WITH THE HELP OF BULLDOG "PLUG-IN" LIGHT AND POWER

IT'S NOT alone economy or safety, it's not alone ease of installation or movability, it's not alone asset value or 100% salvability that are daily causing more and more major war production industries to equip new plants and modernize old ones with BullDog "Plug-In" Light and Power Distribution Systems.

Great as these BullDog advantages are, there is still another outstanding BullDog advantage which leads them all in importance at this time.

That advantage is time saving — precious minutes and hours gained on the production line.

With BullDog Bus Duct Systems you don't go back to a centralized switchboard or panelboard when you add a new machine or change the location of an old one. You don't waste hours tracing wires if one machine "shorts" and stops the whole production line. You don't keep electricians busy trying to get adequate lighting for each machine.

Three Time-Saving BullDog Systems

BullDog BUStribution DUCT, *for Power,* takes power right to the individual machine, where it is tapped off quickly and easily with various types of protective plugs. BullDog Industrial Trol-E-Duct, *for Production Lines and Assembly Benches,* furnishes mobile power and support for portable tools. BullDog Universal Trol-E-Duct, *for Light,* permits instant movability of lights or the addition of new ones in a few minutes.

Widely used with these three systems are all the time-tested BullDog standard products — Vacu-Break Safety Switches, SafToFuse Panelboards, Circuit Master Breakers, Switchboards.

To learn how you can have *ready light and power wherever and whenever you want them,* write for bulletins 403 and 412 describing BullDog "Plug-In" Flexible Electrical Distribution Systems. Better yet, ask to have a BullDog engineering representative call on you.

BullDog "Plug-In" type BUStribution DUCT with individual protective plugs for each machine carries power to this battery of lathes in an industrial plant which is manufacturing scientific equipment for the United States Army and Navy.

BULLDOG
ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
BullDog Electric Products of Canada, Ltd., Toronto, Ontario

ORIGINATORS OF FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS FOR LIGHT AND POWER

Washington . . .

• Penalty provision in Second War Powers Act sponsored by WPB so it can recommend punishment for top company officials . . . Violations previously discovered will not be open to prosecution, however.

WASHINGTON — Another scalpel for Dr. F. D. Roosevelt's industry operations was forged by Congress with the passage of the Second War Powers Act. It can cut the sinews of industrial ownership by extending the power of the government to acquire land, plants and machinery by condemnation proceedings. Manufacturers whose civilian production has already been pared to the bone must give precedence to priority rated military contracts, under penalty of a $10,000 fine for violations, or imprisonment for one year, or both.

WPB, which has been investigating alleged priorities violations in the iron and steel, secondary aluminum, and copper and brass industries on a nationwide basis, will be precluded from criminally prosecuting any violators which it has previously discovered because the prosecution would be ex-post facto. Or, to interpret legalistic lingo, it is a case of water over the dam.

On the other hand, WPB plans 50 such surveys with the aid of the Wage and Hour Division of the Department of Labor, the Bureau of the Census, Department of Commerce, the Treasury Department, and the Federal Trade Commission. John H. Ward, assistant chief of the WPB Compliance and Inventory Branch, said some time ago, "As the priorities system becomes better understood, emphatic action will be taken in a greater percentage of the cases."

BEFORE the passage of the Second War Powers Act WPB already had formidable sanctions it could bring down upon the heads of priority violators. In case of refusal to supply material under a rated contract, an allocation order could be issued, pursuant to an amendment of the Vinson Act, directing the supplier to deliver the material to the defense consumer. If justified, a mandatory injunction could be obtained to enforce compliance.

Where there is a refusal to recognize a priority rating on an order placed by the War or Navy Department, it is conceivable that WPB could propose that the plant be seized by the United States, and heavy fines exacted. In certain cases of refusal to supply material, WPB has the power to requisition.

In the case of an aggravated violation, an order could be issued forbidding the offender, for a specified period, to employ or deal in the material covered by the violated order. The effect of this order in most cases would be to put the violator out of business. The injunction would be used at this point to enforce the order.

THE latter type of order is known as the S or suspension order and has been directed against a number of concerns, but WPB's policy in this respect, according to one official, has always been governed by war production considerations. For instance, if the greater percentage of a plant's business is devoted to munitions manufacture, WPB considers it would be abortive to issue an S order.

Besides, the officers of the company who were responsible for the priority violation would not heretofore have been punishable for their action, and undue hardship is worked upon stockholders and employees by the severity of the suspension order. This is why WPB sponsored the penalty provision in the Second War Powers Act—so that it could recommend punishment for top company officials. But WPB still holds the power to suspend as a club over the head of industry, and may exercise the power in the future.

When the survey unit of the compliance branch has made findings of priority non-compliance, cases are routed to the analysis unit for detailed study. The analysis unit may recommend further investigation by the survey unit or punitive action by the legal division which considers the merits of the case and takes appropriate action.

EXAMPLES of WPB action in selected instances follow:

Last Friday at Chicago, Federal Judge John P. Barnes issued a permanent injunction against the Chicago Alloy Products Co. forbidding the company to sell, dispose of, move, or conceal its supplies of nickel or cadmium. The order prevents the company from interfering with the Division of Industry Operations' attempts to examine its books and records. WPB alleged that the company had negotiated deals without priority sanction, and at prices far in excess of the maximum prices established by OPA.

The first suspension order, dated Oct. 16, 1941, like most orders issued since, was directed against aluminum operations— those of the Central Pattern & Foundry Co., Chicago. The company was forbidden to employ aluminum until March 31, this year, with the exception that it might use the metal in inventory to complete defense orders on its books as of Oct. 1, 1941. The company was charged with shipping 41,449 lb. of aluminum products for non-essential uses in violation of directions of the defense agency. About 250 employees were affected.

A SUSPENSION order was issued Dec. 20, 1941, against the State Metals & Steel Co., Inc., Canton, Ohio, for alleged deliveries of high grade aluminum scrap, for melting into ingots, without preference rating. It was charged that 67,000 lb. of aluminum ingots was diverted for purposes not sanctioned by WPB. All priority assistance was withdrawn from this

A Simple Calculation

WILL TELL YOU IF YOU HAVE ENOUGH CUTTER SHARPENING MACHINES

CINCINNATI No. 2
Cutter and Tool Grinder
Catalog M-962 contains complete description and specifications
Write for your copy

● From the broader viewpoint, cutter sharpening equipment occupies an important position in production. True, these machines merely sharpen cutters, but they constitute a link in the supply line that keeps the production line running.

A one-minute calculation will tell you if you have enough cutter sharpening equipment to keep your milling machines in operation: merely work out the ratio between the milling machines and cutter sharpening machines. About 15 to 1 (maximum) is satisfactory for light cuts on conventional metals, about 10 to 1 for general purpose work, and about 5 to 1 for heavy cuts or exceptionally tough materials.

Of course other factors may alter these ratios, but they will serve as a starting point in raising production which may be too low for the number of metal cutting machines at work. Check your cutter grinder equipment at the first opportunity don't let a ratio limit your production.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

company until July 1, 1942, and it was prohibited from dealing in aluminum, during the period of the suspension.

The National Pressure Cooker Co., Eau Claire, Wis., was charged with accepting delivery of 740,856 lb. of aluminum scrap in violation of Supplementary Order M-1-c, since, it was charged, no preference rating had been assigned to such deliveries. WPB on Feb. 10 forbade the company to receive or deliver aluminum or its products for 60 days, unless authorized by the Director of Industry Operations. The acceptance of purchase orders during the period was also banned. The company was also forbidden to process any metal between Feb. 20 and March 10. Bracketed with the National Pressure Cooker Co., the New England Metals Co. was alleged to have delivered about 555,000 lb. of aluminum scrap to the former company. The same penalty was imposed.

THE A. B. C. Pattern & Foundry Co., Chicago, WPB charged, accepted delivery of 17,510 lb. of aluminum scrap without a preference rating and allegedly made a misrepresentation concerning the deliveries. It was forbidden to receive, deliver, or accept orders for aluminum or aluminum products for 60 days, and was forbidden to process any aluminum between Feb. 20 and March 10.

Another two-month suspension of similar quality was imposed on the Acme Aluminum Foundry Co., Chicago, which was charged with delivering 78,000 lb. of aluminum castings on non-defense orders not approved by WPB.

Complete suspension of production and sales of electric washing and ironing machines by the Hurley Machine Division of Eelectric Household Utilities Corp. for a period of six months was ordered by WPB because, WPB alleged, the company exceeded by 22,000 washing machines and ironers, the quota established for it by Limitation Orders L-6 and L-6-a.

Knisely Speaks at Rockford

Rockford, Ill.

• • • **Stanley Knisely,** executive vice-president of the Associated Business Papers, was the principal speaker at the dinner meeting of the Rockford Industrial Marketers, March 3. Knisely discussed industrial advertising during wartime.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

NOW THAT'S A BEARING FOR A COAST GUN CARRIAGE AND THIS IS A GEAR FOR A TANK-- NOW WE'LL GO INTO THE BRASS DEPARTMENT!
ONE O' THEM LOOKS LIKE A PROFESSOR AND THE OTHER LOOKS LIKE A SPY! BRIGHT LOOKIN' GUYS!
NEITHER'LL LEARN A THING--EVEN A GUY WORKIN' HERE CAN'T! THEY SHOW YOU A BOLT, THEN A THOUSAND OTHER THINGS, THEN TH' NUT, THEN A THOUSAND OTHER THINGS, THEN TH' WASHER FOR TH' NUT AN' BOLT--
HEROES ARE MADE, NOT BORN
J.R.WILLIAMS 3-13
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.

New Manganese Projects Advanced for Financing

Washington

• • • **Three large** and several small projects for the production of high grade manganese concentrates from low-grade domestic ores were recommended last week by WPB Director of Materials William L. Batt for federal financing. He said that the new plants, plus those already in operation, should produce well over 600,000 tons a year as compared with 30,000 tons domestically produced in 1939 and 40,000 tons in 1940. It was stated that intensive studies and experiments carried on during the past year by the Bureau of Mines and Geological Survey and by private groups have developed methods that will produce high grade manganese concentrates from 10 to 12 per cent ores.

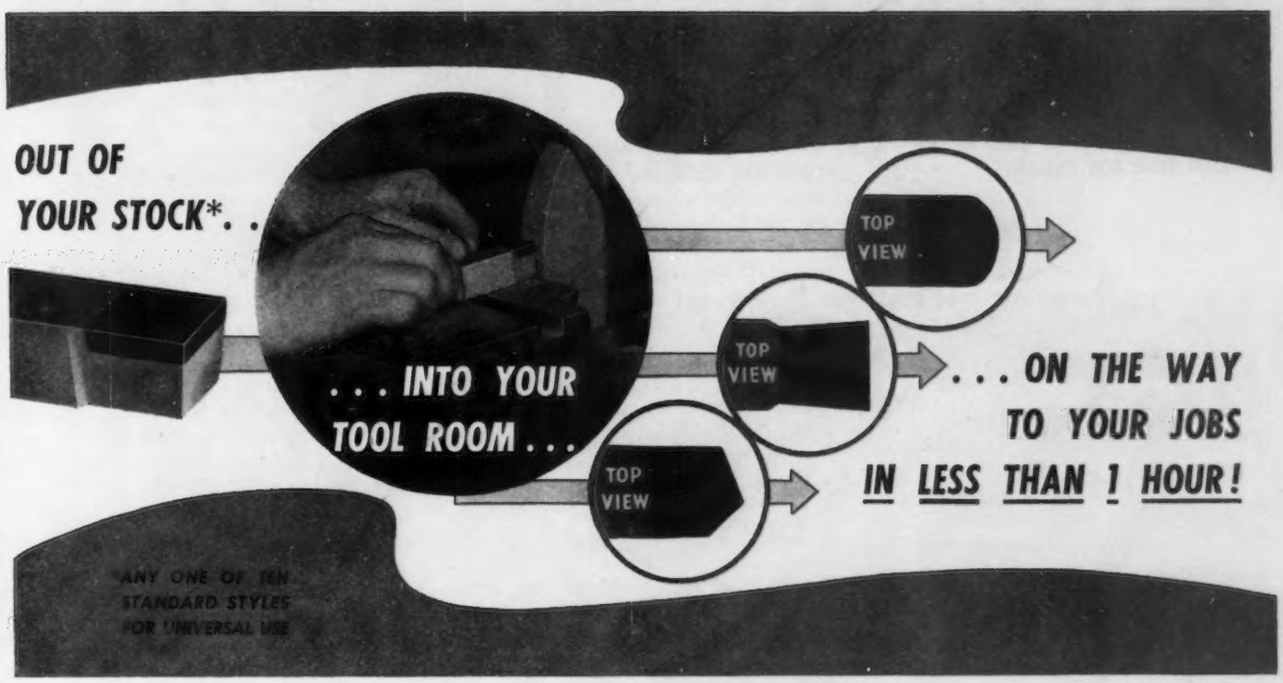
Mr. Batt said that tests that have been evaluated by the advisory committee of the National Academy of Sciences will be applied on the three large projects that will produce more than two-thirds of the expanded domestic output—in the Cuyuna Range of Minnesota, the Missouri River area in South Dakota and in the vicinity of Boulder Dam in Nevada.

The Cuyuna Range, largest of the three projects, Mr. Batt said, has presented the most difficult extraction problem. More than 1,000,000 tons of ore a year will be treated at a government-built plant to be erected in the area.

In the South Dakota area, 16 per cent manganese concentrate will be extracted from 1 and 2 per cent manganiferous shales. At the Nevada mill, the plant will handle around 300,000 tons of ore annually. In addition to these three large projects, seven small ore dressing plants are to be built in Arkansas, Montana, Utah, Nevada, Georgia, and Tennessee to treat production from small mines. These plants will treat from 150 to 500 tons per day of crude ore and will produce high grade manganese concentrates and an appreciable amount of manganiferous iron ore.

Other manganese deposits are being examined and tested by the Bureau of Mines, Mr. Batt said. Meantime, the United States has a sizeable manganese stockpile.

How To Get "Special" Carboloy Tools On Your Job *In Less Than One Hour!*


OUT OF YOUR STOCK*. . .
. . . INTO YOUR TOOL ROOM . . .
TOP VIEW
TOP VIEW
TOP VIEW
. . . ON THE WAY TO YOUR JOBS IN LESS THAN 1 HOUR!
*ANY ONE OF TEN STANDARD STYLES FOR UNIVERSAL USE

Busy production executives who want to establish a way to get specially shaped carbide tools on machining jobs *FAST*, can save time and money and get immediate results by following this simple, practical plan:

1. **Have your tool designers select Carboloy Standard Tool styles suitable for quick adaptation to your special shapes.**
2. **Establish, in your tool crib, a nominal stock of the standards your designers select.**
3. **Grind these standards to special shapes *as required.***

This standardization plan is being followed today by many leading producers of tanks, engines, shell, guns, small arms and other war materials. It permits maximum tool economy, eliminates delivery delays and provides a way to get special tools on the job *FAST!*

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CARBOLOY STANDARD-STOCK TOOLS

Adaptable to 80% of all turning, boring and facing applications.

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TOOLS - DIES - DRESSERS
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FOR THE MANUFACTURING · MINING · TRANSPORTATION · CONSTRUCTION INDUSTRIES

WEST COAST...

• California legislator opposes plan to have salvage material pass through hands of commercial scrap collectors ... San Francisco scavenger charges detinning plant $12.50 per net ton for cans.

SAN FRANCISCO — Efforts of the WPB to have all salvage material pass through regular commercial channels may run into a snag if the ultimatum laid down last week by State Senator John H. Shelley, AFL kingpin in northern California, is echoed elsewhere in the nation.

Shelley said that officials in the general salvage campaign being conducted by the Bureau of Industrial Conservation had proposed that business lend the trucks and that organized labor contribute its services in the general collection campaign in northern California. Organized labor was agreeable to this, he said, if the material collected was to be delivered to some central point, sorted, and then delivered directly to defense industry without profit accruing to anyone. Upon hearing that the proposed local program, at least, contemplated the material being delivered to scrap, junk, or other waste material dealers and then passing through regular commercial channels, Senator Shelley blew up and said that as far as organized labor was concerned, Barkus distinctly was not willing.

"Why should we work for nothing and business contribute its trucks so the waste material dealers can make a profit?" he demanded.

To the suggestion that some materials, at least, had to be sorted, prepared and processed before they could be used, Mr. Shelley asserted commercial dealers could contribute their services as a patriotic gesture, just like everyone else. No one pointed out to Senator Shelley that under current OPA ceilings, some dealers complain that they are regularly contributing their services.

The City of Berkeley, Cal., is avoiding this issue by using city trucks, paying regular union rates to drivers, and selling the waste material collected through regular commercial channels. The proceeds go to the local disaster fund.

THE public in this section has been sold to such an extent on the idea that community collection of tin cans will solve the tin shortage that, unless the salvage campaign is slowed down, a tin can drive will duplicate the aluminum drive and tin cans will be stacked high without facilities being immediately available for detinning. The only detinning plant in northern California that of the Metal & Thermit Corp. at South San Francisco, currently is handling 300 to 400 tons per month although it has facilities for 800 to 1000 tons. These facilities could be doubled. In southern California, the only detinning plant, that of the Los Angeles By-Products Co. is regularly handling 2000 to 3000 tons monthly from the city collection but could handle 4000. Even if the WPB erects one of its 12 proposed detinning plants in California, as is likely, the State's contribution to the national tin supply is not likely to be large.

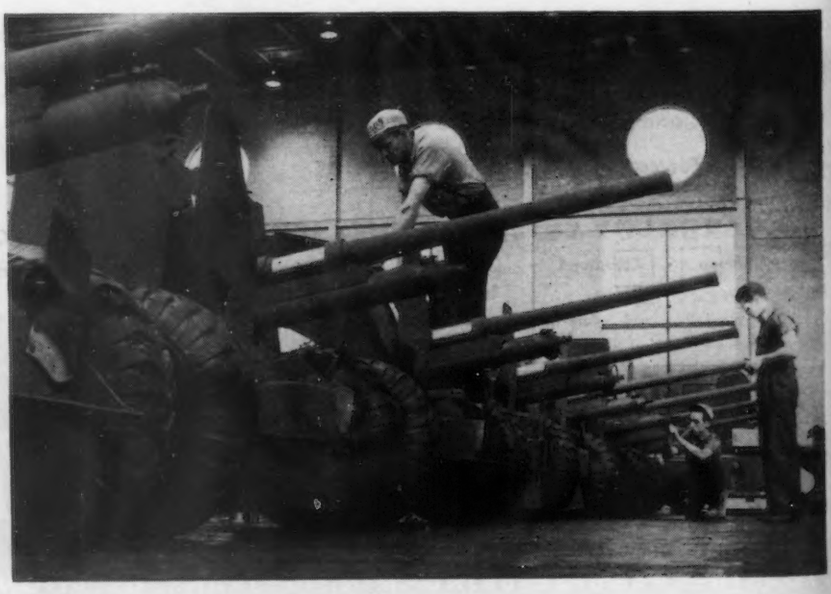
San Francisco, which contracts with a private scavenger, and which does not segregate cans from the rest of its household garbage, has a problem in that the scavenger is reported to charge the detinning plant $12.50 or more per net ton for cans. The scavenger claims they cannot be separated for less. In Los Angeles, where the city handles its own collection and the cans are segregated from the rest of the garbage, they go to the detinner on an open bid of about $4 per net ton. Such a spread indicates that the OPA may have to step into the picture if a nation-wide tin can campaign is undertaken.

The Pacific Coast could leave the matter of detinning unsolved and still have good demand for its cans. Demand by the copper mines for 1942 is estimated at 107,000 tons of tin cans and the mines think they will run short about 35,000 tons this year. Mine water is run over the crushed and shredded cans, resulting in deposition by a chemical action of a substantial amount of otherwise wasted copper.

Coast consumption of tin plate is

TANK SMASHERS: These two-pounder, anti-tank guns are being turned out in large quantities by a Canadian factory to do a little blitz-busting for the United Nations. This is only one of the 10 types of gun now being built in Canada.

British-Combine Photo



SMALL TOOLS LIKE SMALL ARMS ARE ESSENTIAL TO FINAL VICTORY

●

FOSDICK *High Speed* SENSITIVE DRILLS

Sensitive drills are as essential to "all out" production as infantry is to an army. In the tool and die shop or in the production line, Fosdick H. S. Sensitive Drills are filling a definite need for speed—accuracy and sensitivity on small drilling operations.

The machine shown at the Experimental Tool and Die Co. of Detroit is a typical example of the work Fosdick Sensitive Drills are handling in hundreds of shops now engaged in War work.

Designed to meet small drilling requirements up to 1¼". Furnished with single and two speed motors and providing a range of 6 to 18 speeds.

For full information write for Fosdick H.S. Sensitive Drill Bulletin H.S.A.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI · · · OHIO

ON THEIR WAY TO GERMANY: Stacked in a freight car, these 500 lb. demolition bombs are ready to leave for an ordnance loading plant, and then to the fighting fronts all over the world. After that, they will be delivered to the Axis powers by fast United Nations bombing planes.

about 400,000 long tons annually. Inasmuch as a large proportion of the products for which the tin plated containers are used is shipped out of this territory, a good recovery average will be required even to supply the needs of the mines.

ACCUSATIONS by the CIO that hiring by defense industry is lagging behind displacement caused by the shutdown of non-essential industries is borne out by the most recent figures available from California unemployment insurance and placement offices. For the week ended Feb. 14, 68,943 persons were drawing California unemployment insurance. For the week ended Feb. 7, the employment office made 9367 new placements, and 10,733 applications were filed for unemployment insurance. For several months the CIO has been carrying on a campaign, similar to that sponsored in Detroit, to have automobile assembly and accessory manfacturing plants converted to defense work. The union makes no proposals as to how the plants could be converted, but suggests that inasmuch as the Pacific Coast is a jumping-off point for military automotive equipment, such equipment could be assembled here rather than in the East with consequent saving of rolling stock. Since the complete shutdown of the plants last month, the union states that only a small percentage of those laid off have been able to find employment.

Most of the men displaced, the CIO says, are attending defense training classes while awaiting employment, but declares that the defense training classes are turning out graduates faster than they can be hired. In Oakland, which they offer as an example, 1500 trainees have been placed and 2500 are waiting to be placed.

Under ordinary circumstances such claims would be subject to considerable discount because of the source, but the possibility that they could be substantiated is hinted by work schedules of two southern California aircraft plants. One major plant and one medium sized plant are working a five-day week. Material shortages are blamed in one case, failure of subcontractors to make deliveries because of material shortages in another. Subcontractors are able to get material sufficient for only a five-day week in some cases.

IF the situation were not so serious, it might be displayed as a horrible example of what may happen on a larger scale if present efforts to transfer military plants east of the Rockies are successful on a broader scale. Apparent lack of coordination between the program for production in 1942 and the program for safe location of vital plants is certain to have broader repercussions unless liaison is established.

The story is circulated in Los Angeles that two medium sized manufacturers of aircraft accessories and parts were told that if they wanted any more military business, they would have to move east of the Rockies. One of these plants built an eastern unit and was given all the business it could handle. The other, which did not move, is slowly losing business. If this story could be checked—and it unfortunately can't because of the censorship code—one factor in the production delay might be uncovered. At any rate, idle plants, in the war zone or not, are not helping in the battle of production.

Going back to the CIO's views on the labor situation, it estimates that even at the peak of war employment, and allowing for the selective service, a surplus of semi-skilled and unskilled workers will exist in California although there will be a deficiency of about 5000 skilled workers.

Aircraft plants in the Los Angeles area have jointly set up a central hiring office to be operated by the United States Employment Service but also to be manned by personnel men from the various plants. Douglas, Lockheed, North American, Vultee, Northrop, Consolidated and Timm aircraft companies will supply their labor demand through the new office. After it is in full scale operation, applicants will no longer be received at the participating plants. More than 100,000 persons are expected to be interviewed within the next eight months.

THE Army Air Corps' plant protection committee developed the central hiring office plan to eliminate applicants from plant premises "because of the possible danger from great numbers of applicants there." A uniform application is to be presented and Federal interviewers will classify the applicants before passing them on to company representatives.

The United Brotherhood of Welders, Cutters & Helpers, Local 2, the

backbone of sporadic welders' strikes in the Pacific Northwest, last week announced that its executive board had forbidden further work stoppages for the duration of the war.

In the past, union promises that no further work stoppages would occur have been modified as particular disputes arose, and as long as the basic agreements of the United Welders are unsettled, work stoppages must always be regarded as a possibility. The current promise probably represents a one-round victory for the AFL, following the dispute several weeks ago when 1600 Seattle and Tacoma welders walked off the job in protest against the discharge of several members for failure to pay AFL dues. The AFL holds closed shop contracts in the yard affected. Until the AFL recognizes the welders' union as a separate member of the Federation, no permanent peace is likely to exist in the Northwest. Local No. 2 now claims membership of 1947 men. About 80,000 are now employed in Seattle war industries.

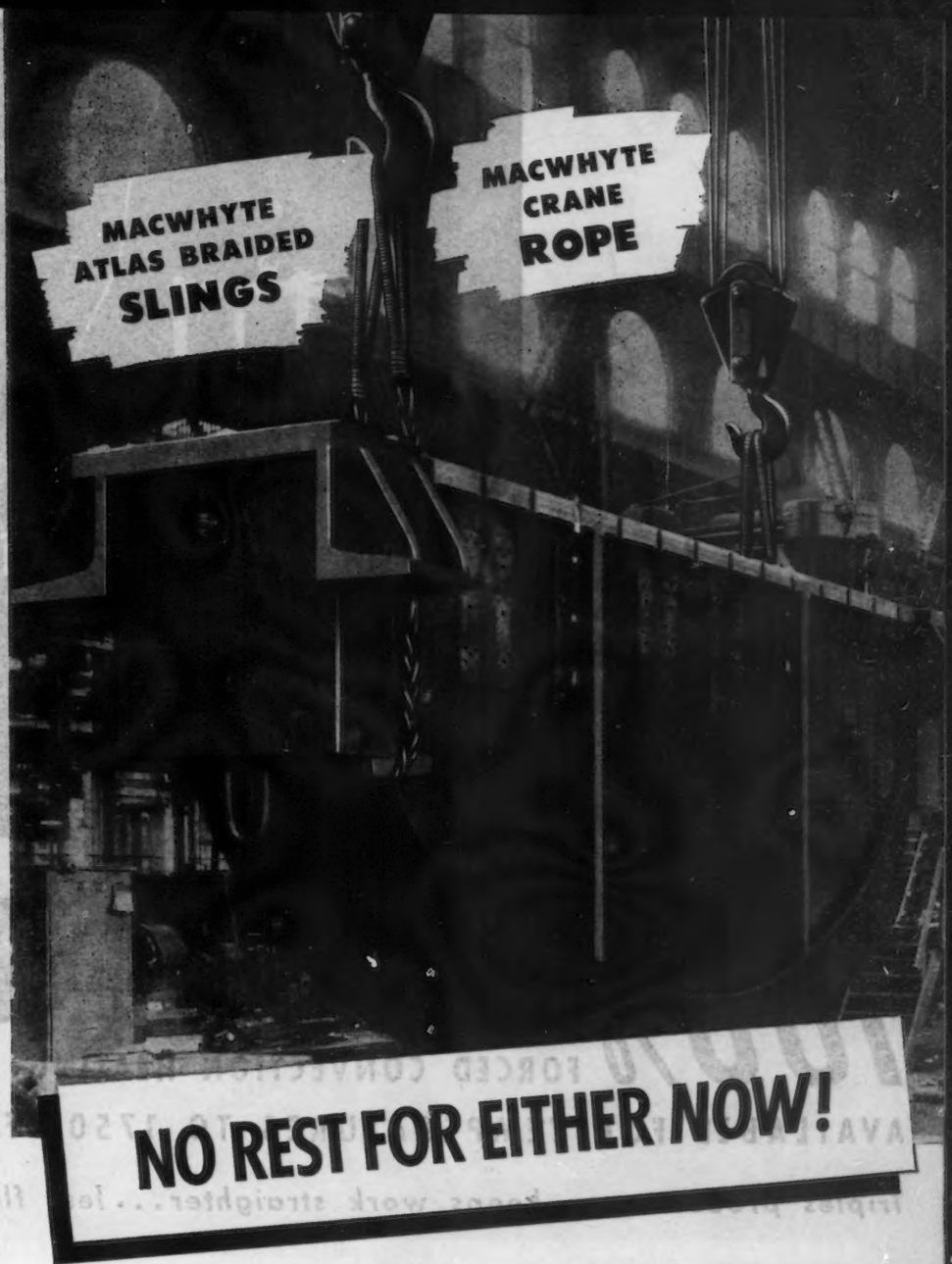
As the California Shipbuilding Corp., Los Angeles Harbor member of the Kaiser group, launched its seventh ship in a 30-day period last week, contracts were announced by the Maritime Commission for a new yard to be constructed by the Kaiser Co., Inc., near Portland, Ore., and additional ways at the Richmond, Cal., yard of Permanente Shipbuilding Corp. The new awards are regarded as a performance award for the Kaiser group.

The Wilkeson Products Co. has been formed to build a coke plant at Tacoma, Wash., using local coal deposits. Curran-Knowles ovens will be installed.

Slag On Rain-Soaked Ground Causes Michigan Bomb Scare

Detroit

• • • **Hot slag, dumped on** rain-soaked ground on the Detroit River bank at the Great Lakes Steel plant in Ecorse, caused a terrific blast Sunday night which alarmed residents within an 8 to 10 mile circle and scared many into believing that Detroit was undergoing an air raid. On contact with the wet ground the slag formed a huge bubble which on bursting hurled debris in all directions. No one was injured, plant officials said, and no damage was reported.



NO REST FOR EITHER NOW!

Men can't stand the hours CRANE ROPES must stand today. In many plants Macwhyte Crane Ropes now work 24 hours a day, 7 days a week . . . and they're ever on the alert!

Get such tireless crane ropes for your job. Get speed and safety with Monarch Whyte Strand PREformed . . . a crane rope with highest strength, one that resists wear and fatigue. It's a tough rope especially made for today's tough job.

Tell us the make, model, and capacity of your crane . . . and we'll give you the correct rope for it: Monarch PREformed.

Outer wires in each strand are Macwhyte PREformed's first line of defense. They have maximum tensile strength, great abrasion resistance.

Inner wires in each strand are the reserve strength of the rope. They are specially drawn with maximum flexibility and toughness for inside service.

Slings to s-p-e-e-d your loads SAFELY are Macwhyte Atlas Braided Slings. There's no better auxiliary crane equipment.

Made from both left-&-right lay endless wire rope construction (see illus.), Macwhyte Atlas Slings have:

1. Perfect balance that eliminates spinning.
2. Extreme flexibility; handle like a silken rope; resist kinking.
3. No splices to wicker.
4. Positive safety of endless wire ropes.

Macwhyte Atlas Slings are time savers, labor savers, property savers, and even life savers. They're used all over America to handle pipes, shapes, bars, armament, machinery, rolls, etc.

Today you MUST step up production SAFELY. Let Macwhyte Atlas Slings help you. Write on company letterhead for helpful rigging bulletins.

CRANE ROPES to hoist the load . . .
BRAIDED SLINGS to harness it safely. *BUY BOTH FROM*

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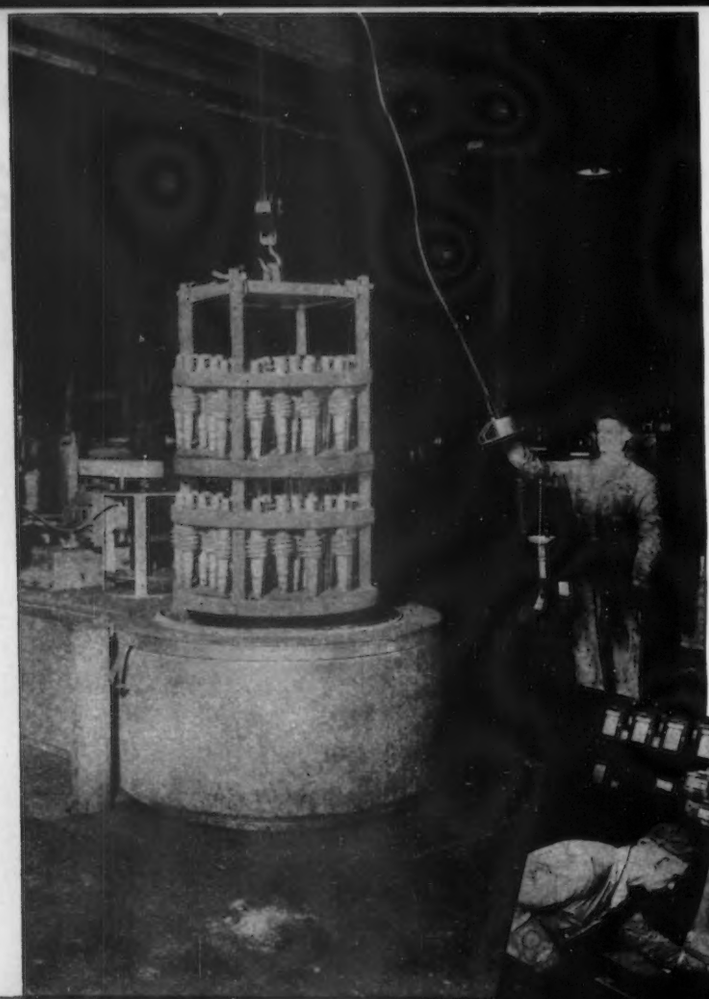
2911 Fourteenth Avenue, Kenosha, Wisconsin — Manufacturers of wire rope to meet every need — Left-&-Right Lay Braided Slings — Stainless Steel Wire Rope — Monel Metal Wire Rope — Aircraft Cable, Aircraft Tie-Rods, "Safe-Lock" Swaged Terminals.
New York Pittsburgh Chicago Ft. Worth San Francisco Portland Seattle. *Distributors throughout U.S.A.*



LEFT: A load of 20 lb. worm gea being removed from a Super-Cyclone

BELOW: Worm gears being heated in the Conventional Radiation Type Furnace.

100% FORCED CONVECTION HEATING AVAILABLE FOR TEMPERATURES TO 1750° F.

Triples production . . . keeps work straighter . . . less floor space

TYPICAL OF WHAT SUPER-CYCLONE 100% forced convection heating is doing to increase heat treating production and keep the work straight is the way it goes after this worm gear job. The worms are SAE 4140, weigh 20 lbs. each, and have a maximum section of 3". They are heat treated to 45 R. C. In the Super-Cyclone, 100 of the worms (a 2000 lb. load) are placed on the fixture as shown in the above photograph, heated in a 38" diameter x 60" deep Super-Cyclone and quenched on the fixture. Previous method was to heat in a radiation type box furnace. In the box furnace, having hearth dimensions 36" wide x 5' deep, a maximum of thirty worms could be loaded at once. Time to heat the thirty worms in the box furnace was 3½ to 4 hours. Time to heat the 100 worms in the Super-Cyclone is 4 hours.

PRODUCTION TRIPLED: Floor space requirements for the Super-Cyclone and the box furnace are the same, each requiring a space 8' x 11'. The box furnace turns out 7 or 8 worm gears per hour. The Super-Cyclone turns out 25 worms per hour, or looking at it another way, 160 pounds of work per hour as compared to 500 pounds of work per hour from the Super-Cyclone. A production increase of 300%.

HOW ABOUT STRAIGHTNESS? When the worms were hardened from the box furnace 85% went out between .015" and .025". Due to the high hardness of 45 R. C. straightening was extremely touchy. Straightening time per 100 worms required 8 hours time. When hardened from the Super-Cyclone, *90% of the worms required no straightening whatsoever,* and the balance was out a maximum of .010", easily taken care of in 30 minutes on the press. A reduction of 7½ hours in straightening time per 100 worms.

HANDLING REDUCED: Approximately 15 minutes were required for a man to load the box furnace. In quenching, three men handling the worms individually required 15 minutes time. A total of one man hour per 30 worms, or 3 man hours per 100 worms. Handling 100 worms in the Super-Cyclone required 15 minutes to load the fixture, 5 minutes to charge it into the furnace, 5 minutes for quenching, and 5 minutes to unload the fixture. This is a total of 30 minutes handling time per 100 worm gears or approximately 1/6 the time required for box furnace handling. It might be noted that the parts are drawn on the same fixture.

These savings are typical of what the new Super-Cyclone heating principle is doing in plants all over the country. And they are possible because 100% forced convection heating drives the heat through every part of the charge, heating every part accurately. Thus heavy loads are heated rapidly, distortion is eliminated or held to a closer range than is possible with conventional equipment. Handling is reduced so that each man in your heat treating department can turn out more work, and per unit of floor area the average Super-Cyclone installation turns out at least three times as much work as any other type of heating equipment available.

SUPER-CYCLONE FOR ANNEALING AND NORMALIZING

Heavy production in a small floor area

AT THE PLANT of a large midwestern appliance manufacturer, one Super-Cyclone 38″ diameter x 48″ deep anneals *twice* as many castings as the 8 box furnaces shown in the lower photograph. The Super-Cyclone requires a space 6′ x 9′. The eight box furnaces occupied a space 36′ x 9′. *Thus the one Super-Cyclone using but 1/6 the floor area actually doubled the production of the eight older furnaces,* or to put it another way: Super-Cyclone production was 12 times greater per unit of floor space than that of the older equipment. The reason for the Super-Cyclone's high production capacity is that the work is stacked up in the furnace, and the heat driven through the work, rather than having the work spread out over a wide hearth area to be heated by radiation.

SUPER-CYCLONE HAS WIDE RANGE OF USES

THE TEMPERATURE RANGE of the Super-Cyclone is 250° F. to 1750° F. with equal heating and control accuracy throughout the entire range. Thus it is a highly flexible unit for the small or medium heat treating department, as well as a heavy production unit for the large shop when put to work on one type of job.

Among the operations being handled by over 100 Super-Cyclones already in service are the following:

HARDENING: Typical of the Super-Cyclone's ability to turn out heavy production of touchy parts is the example shown on the opposite page.

ANNEALING: A large Wisconsin foundry is annealing and normalizing loads averaging 5,000 lbs. One Super-Cyclone 60″ diameter x 48″ deep turns out 17½ tons of work per day.

NORMALIZING: Because work can be stacked up densely, and quickly heated, The Super-Cyclone is an ideal furnace for normalizing.

TEMPERING: The Cyclone Principle of heating is well known to heat treaters for extremely accurate tempering under heavy production conditions. You can temper in the same furnace that you harden in with perfect heating accuracy for both operations.

NITRIDING: The Super-Cyclone fitted with a retort and cover does the same uniform job of nitriding as the standard Cyclone Nitriding Furnace. In addition, the temperature range of the Super-Cyclone enables the retort to be "cured" without removing from the furnace.

SPECIAL HEATING: Because work can be preheated at any desired rate—and cooled according to a definite schedule, the Super-Cyclone is well suited to stress relieving, spheroidizing, malleablizing and other heating operations requiring a specific cycle.

STANDARD SIZES IN WHICH THE SUPER CYCLONE IS AVAILABLE

Delivery time is speeded considerably when standard size furnaces are selected, rather than special sizes which must be drawn up. Drawings are available for the following sizes of Super Cyclones all of which have been built and are in operation. Most are gas fired, although a number are available electrically heated.

CHAMBER SIZE	CHAMBER SIZE	CHAMBER SIZE
16″ diameter x 20″ deep	28″ diameter x 28″ deep	38″ diameter x 60″ deep
22″ diameter x 26″ deep	28″ diameter x 48″ deep	43″ diameter x 48″ deep
22″ diameter x 36″ deep	28″ diameter x 60″ deep	48″ diameter x 72″ deep
25″ diameter x 20″ deep	33″ diameter x 36″ deep	60″ diameter x 36″ deep
25″ diameter x 30″ deep	33″ diameter x 48″ deep	60″ diameter x 48″ deep
25″ diameter x 48″ deep	38″ diameter x 36″ deep	60″ diameter x 72″ deep
	38″ diameter x 48″ deep	

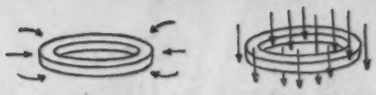
100 SUPER-CYCLONE INSTALLATIONS ALREADY IN SERVICE

IMPORTANT NOTE: Like all other Lindberg developments, the Super-Cyclone has been thoroughly proved under 24-hour a day production conditions for a minimum of 12-months before announcement to the trade. Every effort has been made to restrict the sale of these units until the probationary period was completed. In spite of this, however, many of those who have seen the furnace in operation during the past 18-months have quickly been aware of its production possibilities and requested that units be constructed for them. Thus, over 100-Super Cyclone installations are in service from coast to coast. One or more of these is near you, as is a Lindberg District Office, staffed by practical and competent sales engineers. The Super-Cyclone is *not* a cure all, nor do we represent it as such. It is speeding production, turning out straighter work, and cutting costs for many firms however, and we will be glad to survey its possibilities for you, on your work, at your request.

LINDBERG ENGINEERING CO., 2452 WEST HUBBARD ST., CHICAGO

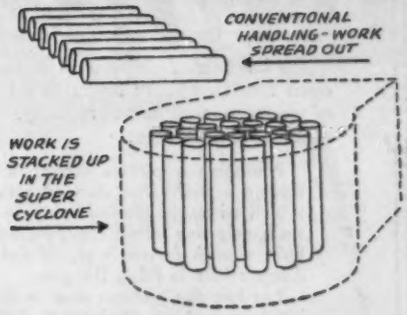
LINDBERG FURNACES

KEEPS RINGS ROUND



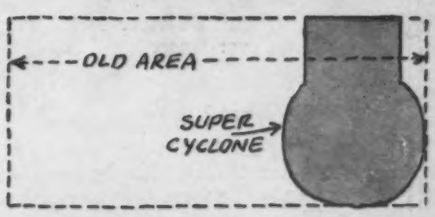
Rings, such as bearing races or ring gears, are allergic to "one-sided" heat. They go out of flat or out of round on the slightest provocation. That's why a large bearing manufacturer is enthusiastic about his first Super-Cyclone, and has ordered a second. In hardening rings 8″ diameter x 3″ high x 5/16″ wall, quenching individually on jigs was formerly employed to hold the rings round. Now, 70 such rings are loaded onto the Super-Cyclone work fixture, heated and quenched all at the same time. The result: rings held well within the desired roundness, and heat treating time cut to ¼ of what it formerly was.

HEAVY LOADS ACCURATELY HEATED



You can easily verify the production increases possible through Super Cyclone Heating. Just spread an average load of your parts on the floor one layer thick as handled in a radiation heated furnace. Measure the area required. Then take those same parts and *stack them up* in a 36″ or 48″ circle, making allowance for spacers or supports. Figure it will take you a *maximum* of 3-hours to heat the piled up parts on a fixture. Five minutes to quench the lot. Ordinarily you will find production increase of from 200% to 1000% possible. Parts remain on fixture for quenching and tempering, a substantial saving in handling.

LESS FLOOR SPACE



Just measure the total floor space required to turn out your present production by your present methods. *As a very conservative thumb rule you can figure that the Super Cyclone will require not more than ⅓rd the floor area needed by any other type of equipment, to handle the same or greatly increased production.* The result... production increases of several hundred percent in present floor area . . . quick production increases without having to move or expand heat treat department area.

These thumb-rules are, of course, general and may not fit all cases. They are averages of what the Super-Cyclone has done in many plants. A Lindberg Representative can quickly and accurately give you any production figures, floor space layouts, or other information you may need.

Fatigue Cracks

BY A. H. DIX

Luce-Thinking

• • • As you know, "The Cook and the Glamor Girl," the Van Deventer classic in the Feb. 12 issue, quoted liberally from *Life's* whimsey on iron and steel making. "Would you call it," cracks a Philadelphia advertising agent, "an example of Luce-thinking?"

Warmed Over Pig

• • • *Life's* description of the process made use of a culinary simile:

> Steel working is really a simple procedure which resembles cooking a good dinner. . . . First some stones and rubble are put into a large $5,000,000 stove called a blast furnace. . . . When the contents melt the ooze is pig iron . . . so called because it is usually kept in pig shaped molds. Before the pig iron becomes steel it has to be warmed over. . . . When the mixture is done, it is dumped out of the furnace, which is really nothing more than an over-sized frying pan . . .

To be fair, *Life* should extend an invitation to an open hearth melter to write an impressionistic account of picture magazine making. The result might be something like this:

> Publishing a picture magazine is really as simple as making a stew. You start off with a pile of photographs submitted by the photographic agencies. You go through them, selecting all the Navy pictures. Then you see if you have enough for an issue. If not, you take a couple of dozen others to fill in the gaps.
>
> You turn the pictures over to the caption writers, making sure that no photograph falls into the hands of a caption writer who knows anything about the subject of the photograph. This is to avoid stodginess.
>
> After the captions are written, you send them to the printers. The words are set in type on a machine that looks like a typewriter grafted onto a small pipe organ. The photographs are given to an engraver who re-photographs them on sheets of metal. The sheets are soaked in acid. What comes out are known as cuts, so called because in other days the art editor sometimes got a private cut from the engraving house.
>
> Words and pictures are then mixed together, and various minor machines print, fold, stitch and trim.

Orchid

• • • A pat on the back to the New Jersey Zinc Co. for using a photograph of a soldier (page 141, Mar. 5 issue) who looks like a soldier. Most of the soldiers in the ads look either too tough or too pretty, and uncomfortably earnest.

N. J. Zinc's soldier looks just right, medium boiled and not over-tense.

Irate Agent

• • • An advertising agent raps our knuckles for calling your favorite family journal a "trade paper." He contends the term is inaccurate and demeaning.

We used it as an affectionate and admiring diminutive and as a tribute to a notable success in its field. Roy Howard, who heads the Scripps-Howard chain, likes to refer to himself as a reporter, and a couple of weeks ago we heard J. S. Knowlson, Stewart-Warner's handsome president and present chief of the WPB's Division of Industry Operations, speak of himself as "a machinist from Chicago." Of course, if you had referred to Roy as a reporter when he was a mere city editor you would have produced spasticity of the maxillary muscles. Humility adds cubits to a man's stature, but the timing must be right.

However, "industrial journal" is both more descriptive and more dignified. So the offensive "trade paper" has been laid away in a grave right next to "write up."

Mortuary Note

• • • Which reminds us to remind you that when you make out your income tax statement tomorrow night you may deduct the $6 you paid for your favorite family journal.

This is an allowable item of business expense for practically all of our subscribers. We know of only one positive exception. He is a wealthy colored undertaker in a Midwest city. He takes THE IRON AGE because he says he likes to read the editorials.

Stopper

• • • Monkeys are the craziest customers.—*Continental Steel Corp.*

Slogan

• • • Tom Ryan of St. Louis sends this in:

Sinner, saint or sage
Use THE IRON AGE
As your advertising gage.

Somehow it makes us think of the story about the dying man who was asked if he had any last wishes. "Yes," he said, "I'd like to hear the village band once more." So the village band played beneath his bedroom window. He said, "Now I can die in peace. There can't be anything worse than that in hell."

Entire Railroad Thanks Us

• • • The stack of letters about the various priority guides the brains department worked up is now big enough to choke a sperm whale. Practically all the letters order extra copies of the guide and toss an incidental bouquet.

Just one letter is a simple note of thanks—as if you enjoyed a good dinner, called for the chef, and shook his hand. This is it:

> "Please permit me to thank you on behalf of this office and also the entire railroad for the Priority Guide. We appreciate very much having this publication, and it is very helpful."
>
> —*M. W. Towner, General Purchasing Agent*
> *Western Maryland Railway Co., Baltimore.*

War Is Hell

• • • Among the war's minor horrors is the cutting off of pictures of streamlined sirens posing in front of streamlined cars. It used to be a dull week when Bill ("The Assembly Line," see p. 76.) Sherman did not pass along to us at least a dozen. But the only one he has sent in this year is a picture from the neck up of a Miss Jane Easton, who has a new job in the Studebaker Owner Relations division.

While personable, Miss Easton is of the cerebral type and does nothing to relieve our nostalgia. The last one we got of the tight-sweatered type came in several months ago from Nash. Suspecting that it might mark the end of an era, we saved it, and present it here for the convenience of a future Gibbon.

Puzzles

Last week's fly walked 5 inches.

The Feb. 26 skeleton was nothing at all to Tom De Rome of Toronto, and the redoubtable Lt. Com. A. R. Simpson, but a rebuke to A. A. (Francis I DuPont & Co.) Mol for riding roughshod over the asterisk placements.

For every minute under five in which you complete this one, mark your I.Q. up ten points:

A and B do a job in 8 days, A and C in 9, and B and C in 10. How much time does each take doing it alone?

HOISTS THAT SAVE YOU TIME AND MONEY NOW

We can make Prompt Delivery on Northern HI-LIFT HOISTS

WE CAN make prompt delivery of most sizes and types of Northern Hi-Lift Hoists. Increased capacity and improved manufacturing methods enable us to fill all orders rapidly.

Northern Hi-Lift Hoists speed operations—save you time and money—and are built to "take it" over a long period with an absolute minimum of attention.

One piece welded steel frames—turned and ground shafts—large size roller bearings—machine cut heat treated gearing—splash lubrication—these features assure long life—low maintenance.

The Hi-Lift feature makes better use of headroom—increases the effective height of your plants—makes easier the handling of bulky loads.

Write or phone one of the offices listed below for quotations on price and delivery.

NORTHERN ENGINEERING WORKS

General Offices: 2607 ATWATER STREET, DETROIT, MICHIGAN

NORTHERN CRANE & HOIST WORKS, Limited
WINDSOR, CANADA

Offices at—44 Whitehall St., NEW YORK • 547 Union Trust Bldg., PITTSBURGH • 53 West Jackson Blvd., CHICAGO • 125 West Central Parkway, CINCINNATI • 4135 Gratiot Ave., ST. LOUIS • 913 South 38th St., BIRMINGHAM • 5724 Navigation Blvd., HOUSTON • 2233 University Ave., ST. PAUL

Dear Editor:

SPECIFICATIONS WANTED

Sir:

Once again you have come though beautifully with a nice set of specifications. I would like two sets of the Government specifications for aircraft stainless, carbon and alloy steel, as published in the Feb. 19 issue . . . this summary should prove to be very useful.

H. O. NORDQUIST

Joseph T. Ryerson & Son, Inc.
Milwaukee

Sir:

I was very much interested in the fine specification tables on pages 62 to 65 of THE IRON AGE of Feb. 19. Since we could make good use of these charts for general reference work, I wonder if this information could be obtained in the form of a reprint . . .

C. F. FELEDY

American Rolling Mill Co.
Middletown, O.

• To fill the heavy demands for these aircraft steel specifications, we've had reprints made. Copies are available at 5c. each from Reader Service Department, THE IRON AGE, 100 East 42nd Street, N. Y.—Ed.

EDITORIALS

Sir:

I have always very much enjoyed and appreciated your page of editorials, especially during the past few months.

We have to purchase a page in the local paper once a month—and I wish you would send me what you consider your outstanding editorials that would be appropriate—make people think—and like, with your permission to use them, giving a credit line, of course.

WM. H. HOBART

Hobart Brothers
Troy, New York

LADLE COOLING

Sir:

On page 54 of the Feb. 5 issue I read with interest a short article on "Ladle Cooling of Liquid Steel," from investigations by T. Land. Can you tell me where to obtain further information on this subject and the tables mentioned?

R. L. FARABAUGH

Bethlehem Steel Co.
Bethlehem, Pa.

• From Steel Castings Research Committee, British Iron & Steel Corp., Grosvenor Gardens, London S.W. 1.—Ed.

HARDSTEEL DRILLS

Sir:

Your article on Hardsteel Drills in THE IRON AGE issue of Feb. 26 is most interesting and we would appreciate your telling us where these drills may be purchased. . . .

B. B. GOODMAN

Samson United Corp.
Rochester, N. Y.

• Hardsteel Drills are made by the Black Drill Co., 5005 Euclid Ave., Cleveland.—Ed.

11833-11834: TECHNOCRACY

Sir:

We desire to reprint in our monthly magazine *The Technocrat*, the picture of a gas-fired annealing furnace which appeared in THE IRON AGE in the Jan. 8 issue. If you would loan us a print of this picture we would appreciate it very much.

M. DORTON

Technocracy, Inc.
Los Angeles

PRIORITY CASUALTY

Sir:

After 30 years we are paying for ½-year subscription to your good paper in advance, although we may be out of business before long, solely due to government restrictions on steel. This will eliminate a $50,000 payroll and put about 20 good men, who have been with us 25 to 20 years, out of work.

W. C. TORREY

Boston Metal Ceiling & Mfg. Co.
Cambridge, Mass.

ISSUES SOLD

Sir:

The publication of our letter on your Dear Editor page in the Feb. 19 issue was fine. We already have a bid for a number of them (back copies of THE IRON AGE) with a check enclosed.

STANLEY W. HAYES

Hayes Track Appliance Co.
Richmond, Ind.

NICKEL

Sir:

We have several large still tanks and two barrels all equipped with sufficient anodes to operate this year. Can we use this set-up until the nickel in the tanks is gone? Our product is not covered by priority, but it does seem rather incongruous to let this nickel plating set-up just stand dormant when it can be used.

W. H. L.

• No nickel may be used after April 1 for articles not on the exempt list in WPB order M-6-b. You might try to get some plating job work for products with a preference rating of A-1-c or better.—Ed.

SHELL FORGING

In your Feb. 26 issue you had an article on forging shells. We note a reference to other articles on forging shells. Would it be possible for us to secure reprints of these articles?

We have been reading THE IRON AGE for a long time, but unfortunately we have not saved all these issues because we pass them around the shop, and sometimes we cut out articles and other times some of the men take the magazines home.

HARRY M. HANSON

Damascus Steel Products Corp.
Rockford, Ill.

• The demand for the shell forging articles exhausted our supply. So we reprinted all of the recent ones in a 108-page booklet, "Shell and Cartridge Manufacture." Price, $1.—Ed.

BLACKSMITH VISES

Sir:

We are interested in importing from the U. S. blacksmith leg vises for 4, 4½, 5, and 5½ in. jaws. Could you give us the name of a manufacturer of this item?

G. McMASTER

J. L. Demers, Ltd.
Lewis, Quebec

• Try Columbian Vise & Mfg. Co., Bessemer Ave., Cleveland.—Ed.

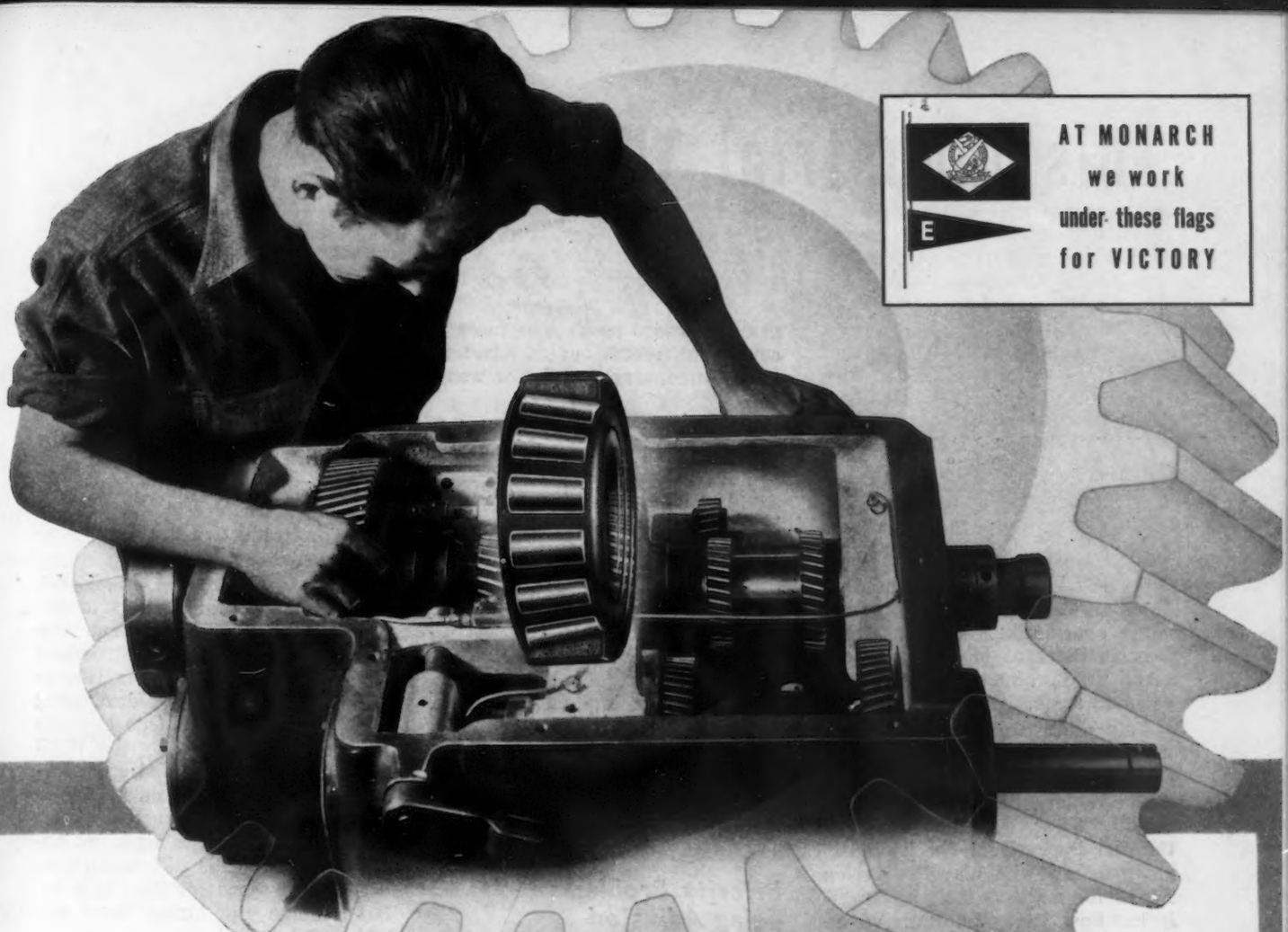
BRIQUETTING PROBLEM

Sir:

The articles by Kalischer in the recent issue are quite good. In fact they are so good that I would like to have about a dozen extra copies for distribution among the staff here . . . I wish you would ask Kalischer how he expects to get the piston out of the die after it has been briquetted, in the design he shows on page 48 of the Feb. 12 issue.

C. R. TALMAGE

Moraine Products Division,
General Motors Corp.
Dayton, O.



AT MONARCH
we work
under these flags
for VICTORY

ANTI-FRICTION BEARINGS

SPECIFIED BY THE *Phantom Gear*

Now more than ever before, owners and operators appreciate the value of anti-friction bearings in Monarch lathes. With machine tools working day and night to provide the implements of VICTORY, smoothness and power rank high in lathe requirements.

In Monarch equipment, the widespread use of anti-friction bearings throughout all major units speeds production, retains accuracy longer, reduces wear, and thus permits hard driving under severe conditions without bearing breakdowns.

The value of anti-friction bearings has been well proved through years of use. Like other important Monarch lathe improvements, they were inspired by the spirit which we call "*The Phantom Gear*," that is continually at work in our plant to design and build lathes that are more useful . . . will produce more . . . and will last longer.

* * *

It is this spirit that prompts Monarch today to produce more lathes than we ever thought possible even under emergency conditions. With no let-down in quality, we'll continue to deliver Monarch lathes to help supply the implements of VICTORY.

THE MONARCH MACHINE TOOL COMPANY • • • SIDNEY • OHIO

Monarch's March of Progress

Many of the most important advances in lathe design were first introduced by Monarch, such as:

Anti-friction bearings for all rotating parts

Helical geared headstock

Flanged spindle nose

Automatic force feed lubrication

Anti-friction bearing taper attachment

Flame-hardened beds

Automatic sizing for all size lathes.

These improvements have made the lathe a more useful tool, by increasing the scope of lathe work and making it more productive. For newest lathe developments, keep in touch with Monarch.

MONARCH LATHES

COVER THE TURNING FIELD

This Industrial Week . . .

o o o

OBSTACLES to the speeding of America's arms program are unlikely to last very long in the face of a general demand for production on a war-winning scale.

This week two obstacles to the tremendous output of war implements needed this year seemed in need of a flattening-out, or a brushing-off. First, competition among the War Department, the Navy Department and the War Production Board for machine tools apparently has now reached a stage where each of these government agencies considers it a moral victory to outsmart the others in obtaining machines for specific plants.

Such misdirected enterprise by government agencies or, for that matter, by private industries competing with each other over some gravely needed product or piece of equipment, seems out of harmony with the country's needs for weapons.

The multiple pressure applied to machine tool producers by the War and Navy Departments, THE IRON AGE is told, has sometimes resulted in two war plants receiving part of their tool requirements and then being unable to operate for a time because they lacked the remainder. Despite pressure for certain machine tools, many vital types of tools remain in plants still unable to obtain government orders. While the scramble for machine tools continues, there are specific instances where planers, milling machines, drill presses and boring mills, continue idle, particularly in the Mid-West.

Priority Problems Being Adjusted

Different from government agency competition for machine tools but similar in its effect in slowing the war program is one phase of the steel priority system. Control over steel production by the War Production Board (except for plates), is hampered by the fact that some Army and Navy officials (however well meaning), who are not familiar with the overall steel picture still have the authority to issue steel ratings. Some of these ratings have been in the upper priority bracket of A-1-a to A-1-j. The tonnage of such items not under the specific control of the War Production Board is by no means small.

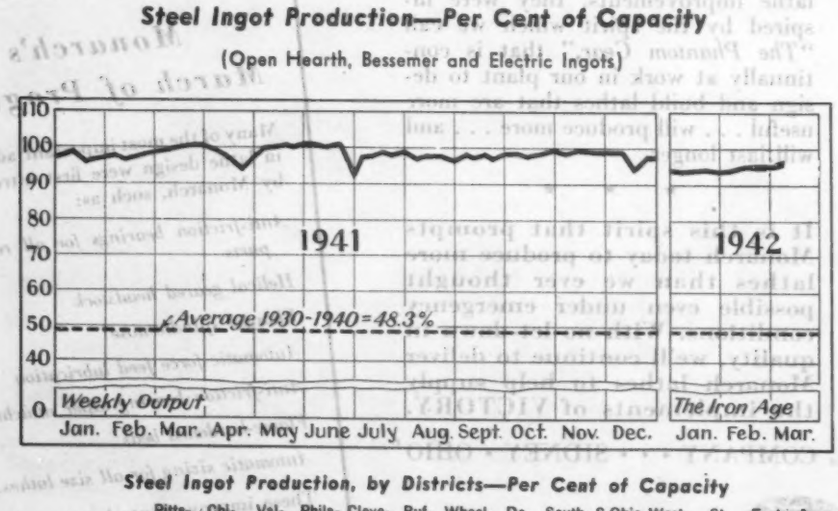
As the war program progresses, however, the rough corners of the steel priorities and allocation system are gradually being rounded off and, in general, WPB action to eliminate constantly developing problems is swifter. One example has been the request by the WPB that steel companies and engineering concerns working on plans for blast furnace construction limit plate requirements to sizes not exceeding 72-in. This will require redrawing of plans for the furnaces, but reduces the strain upon the wider plate mills.

As government controls over steel distribution tightened, E. C. Adams, chief of the WPB Iron and Steel Branch, this week told presidents of steel companies that war orders for steel must be produced in proper sequences of preference ratings, regardless of what the product involves. His letter said, for example, that a sheet or pipe order bearing a lower rating must not be produced before a higher rated bar or plate order requiring the same delivery unless the bar and plate mills in question are operating at the greatest possible capacity. "Your finishing mills, carrying high preference ratings," he said, "must be provided with steel to insure maximum operations regardless of the fact that you may not then be able to assign steel for the production of lower rated products."

One of the most difficult jobs faced by the WPB is the proper distribution of April plate production so that it will go where most needed for the war effort. Forms reaching steel mills from plate consumers indicate a demand 50 per cent more than estimated April production. WPB's new order M-21-c,

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western	St. Louis	Eastern	Aggregate
Last Week	97.0	103.5	99.0	91.0	92.0	92.5	91.0	94.0	99.0	99.0	95.0	94.0*	98.0	96.5
This Week	98.0	103.5	99.0	91.0	94.5	90.0	83.0	94.0	99.0	80.4	95.0	94.0	98.0	95.5

* Revised

covering allocation of steel plates, was formally issued Monday. It changes the definition of plates to include stainless steel but otherwise follows the plate allocation and reporting system already in force.

Pointing up the plate situation in the last few days was a statement by WPB Production Director W. H. Harrison that ship output—one a day in February—is disappointing and that he is concerned over attainment of President Roosevelt's shipbuilding goal. Delay in plate deliveries last October and November resulted in the shipbuilding lag, Mr. Harrison said. WPB Chairman Nelson immediately declared that he did not recognize any possibility that the program would fall short and that efforts would be made to increase the ship program.

Cargo Ships and Yards Awarded

Meanwhile the Maritime Commission has announced awards of contracts covering 163 cargo ships, construction of a 10-way shipyard at Swan Island, near Portland, Ore., for the Kaiser Co., Inc., a 6-way yard at Jacksonville, Fla., for the St. John's River Shipbuilding Co., and addition of three ways to the Permanente Shipyard at Richmond, Cal. These contracts make a total of 922 merchant ships ordered by the commission since Jan. 6. The new contracts provide for construction of 148 additional Liberty ships and 15 C-4 type cargo vessels. The total of merchant ships now building or under contract in U. S. yards is now more than 1800 and the total of Liberty ships built, building or ordered is 1222. One hundred and sixty-nine new ways have been authorized by the Maritime Commission in a year.

Sales of Steel by Auto Firms Approved

Passenger car manufacturers with steel inventories have been given permission to sell sheet and strip steel, hot and cold rolled bars and other products to companies having a rating of A-1-k or higher in the case of stainless steel. Other steel may be sold on purchase orders bearing a rating of A-3 or higher. Sales may also be made to the Defense Supplies Corp., the Metals Reserve Corp., or other corporations organized under the RFC, or by specific consent of the WPB director of industry operations. Sales made to preference rating bearers must be certified to the distressed stocks unit of the WPB iron and steel branch.

If excessive steel stocks are revealed by an inventory study to be made by the WPB automotive branch during the next few weeks, adjustments in the sale of steel from automotive inventories will be made.

Efforts by the WPB to push war plants to a 24-hr. day and 7-day week have resulted in a further upsurge in steel demand, which continues to run far above shipments or production. March shipments are expected to reflect up to 70 per cent on A-3 ratings or better. Actual shipments in priority rated classifications, including tin plate which is now considered to be produced under a "directive" order, are nearly 96 per cent of total shipments. Almost all non-rated steel tonnage being shipped today represents a rolling of rejected material or seconds which cannot be applied against rated orders.

Operators of three of the nation's wide strip mills, Jones & Laughlin Steel Corp., Republic Steel Corp. and Great Lakes Steel Corp., shortly will go into production on rolling light armor plate for tanks. This plate is to be of 55 to 57-in. wide by 60 to 70-in. long (and of a thickness at which enemy agents will have to guess).

Price Ceilings Jeopardized

Price developments were receiving more attention this week with OPA price schedules under study as a result of the increased railroad rates recently granted by the Interstate Commerce Commission. At mid-week it was understood that the problem relates to the absorption of the added charges by either buyer or seller rather than to the raising of ceiling prices. Higher price ceilings must, however, be considered if wage increases being sought by unions, notably the SWOC, are granted. While the SWOC's request for a $1 a day increase was being studied by the War Labor Board, an independent union at Weirton, W. Va., asked the Weirton Steel Co. management for an increase of $1.25 a day.

At mid-week the scrap industry expected widespread confusion over prices unless the OPA took quick action on the freight rate increase. Unless a provision is made whereby the additional freight cost can be placed on the invoice to the consumer, the broker or dealer will have to absorb the increase if he is not to be a price ceiling regulation violator. Further evidence that government allocation of scrap is not a complete success appears at the Ford steel plant where only six of ten open hearth furnaces are melting because of a shortage of scrap.

Steel Output Off a Point

Steel plant operations this week declined a point to 95½ per cent, partly as a result of a shutdown of a Southern plant for repairs and equipment installation. Scrap shortages are increasingly sharp in other areas. Ingot production was up a point to 98 per cent at Pittsburgh and 2½ points higher to 94½ at Cleveland. Losses of 2½ points to 90 per cent were reported at Buffalo, 9 points to 83 per cent at Wheeling, and 9½ points to 80½ in the Southern Ohio River area. Chicago is unchanged at 103½ and Youngstown is holding at 99. Other districts were unchanged.

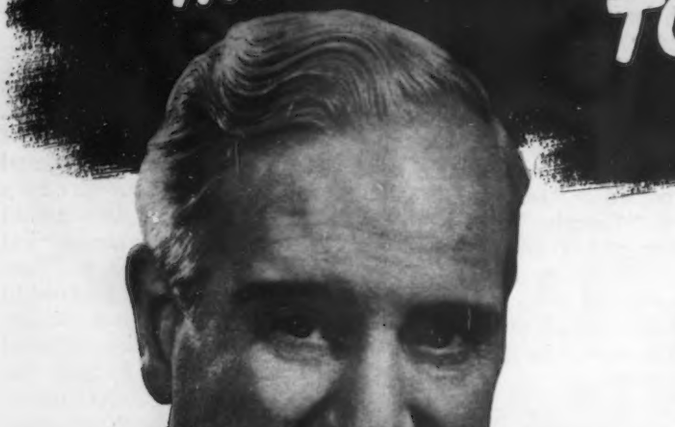
Coke pig iron production in February totaled 4,458,273 net tons compared with 4,970,531 tons in January. Output on a daily basis last month, according to THE IRON AGE, decreased slightly to 159,188 tons from 160,340 tons in January while the February operating rate was 96.4 per cent, off slightly from the 97.7 rate in the preceding month. There were 220 furnaces in blast on March 1 against 217 on Feb. 1.

Weekly Output Shows Rise

Steel production in February averaged 1,631,278 net tons a week, a substantial increase from the January weekly average of 1,609,334 tons and of 1,559,475 tons a week in February, 1941, according to the American Iron and Steel Institute.

Fabricated structural steel awards for the week are estimated at 5125 tons, against 18,200 tons last week, while new jobs totaled 37,900 tons compared to 34,915 tons last week. Reinforcing steel awards are estimated at 31,000 tons against 39,250 tons a week earlier.

Every pound of materials you save .... is a pound more for someone else TO USE !



LET US HELP YOU TO *Save Vital Alloys*

• Either as tools or as raw materials, alloy steels enter into the production of practically all war equipment. *Use these steels wisely; use them well!* That is an infallible way to speed up production; it is also the *only* way to conserve strategic materials . . . to spread the nation's supply of metals and alloys over the greatest possible amount of actual production.

• Write us your alloy steel problems—you'll get your answer either in printed form, or in the personal assistance of our Technical and Field Service Staffs.

★ SEND FOR THIS HANDY CALCULATOR . . . TO SAVE YOU TIME

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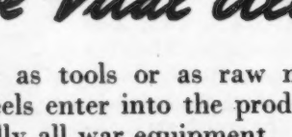

in figuring the weights of alloy steel sections—shapes or flats.

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News of Industry

• • •

Storage of Vast War Goods Output A Problem Soon

Chicago

• • • **An ordnance problem** within the next six months will be that of where to store the ordnance materiel now being turned out by American industry at an ever accelerating pace. This was revealed here recently by a responsible ordnance official who declared that American industry has responded remarkably well to the demand for war goods and that production is getting to be more and more acceptable.

Tank manufacture in America is expanding tremendously and officials of the armed services are highly pleased with the progress in this direction. It is also understood that reports from the world fields of battle on American-made tanks and other new implements of war are glowing in praise of performance.

Chicago ordnance district has now reached the mark of 1400 million dollars in contracts in process in this area. In the past two months, over 700 million dollars in orders were released. As of Dec. 1, 1941, the district had about 1000 prime contracts and an estimated 8000 subcontractors. Of orders in process, 21 per cent are ahead of schedule, 17 per cent are on time, and the remainder are one to two weeks behind delivery dates. Five reasons are advanced for the delays, the first and most predominant, being slow machine tool deliveries, accounting for about one-third of the tardy war contractors.

The others, in the order named, are technical production problems occasioned by lack of familiarity with war production, small tool delivery delays, subcontracting delays, and design and specification changes. In the last reason, it was found that over 90 per cent of the changes made in design and specification occur at the suggestion of the manufacturers themselves.

Harris and Ewing Photo

RUMOR BOARD: Realizing that loose war talk may upset employees in the plant, Lockheed Aircraft Corp., devised a rumor board and placed it in the plant. Now, when a worker repeats a rumor, his fellow workers tell him to write it on the Rumor Board and sign his name. That ends the rumor, because rumors are always anonymous.

Gray Iron Group To Spur Casting Use in War Work

Washington

• • • **A. J. Edgar, formerly** in charge of the gray iron, steel and non-ferrous foundries of General Railway Signal Co., Rochester, N. Y., has joined the staff of the Gray Iron Founders' Society here, W. W. Rose, executive vice-president of the society has announced.

Mr. Edgar will be located at the society's office here at 1719 K Street, N.W., and will be available to assist authorities of WPB and other war agencies in determining to what extent gray iron castings can be safely employed in reducing bottlenecks as they develop in other and scarcer materials. Mr. Edgar will also strive to assure full utilization of gray iron foundry capacity made available by the limitations place on civilian consumption.

Act Promptly on Metal Cleaning Problem, WPB Urges

Washington

• • • **Because of an existing** shortage, WPB's chemical branch on Monday warned fabricators of metals to investigate every possible cleaning method other than chlorinated solvents applicable to their operations. The shortage of such solvents was attributed to the vast increase in metal fabricating and it was stated that the situation will get worse.

Manufacturers with war contracts will be affected as well as others, the branch pointed out, and continued extension of the use of chlorinated solvents will not be possible. At least 30 per cent of the cleaning operations in the metals industry now being done with chlorinated solvents can be accomplished by the use of other materials, such as mineral spirits, non-chlorinated-solvent-water emulsions and alkalis, it is said. It is imperative, the branch warned, that every possible cleaning method be investigated promptly so that necessary changes in method can be accomplished without serious delay in production.

$1.1 Billion Spent On Steel Expansion

• • • **Nearly $1,100,000,000** in private and government funds was expended in 1941 or allotted for expenditure in 1942 to increase steel output for war needs, according to the American Iron & Steel Institute.

The outlay by steel companies themselves for new equipment and construction last year was $295,000,000 and this year they are planning further expansions at a cost of $260,000,000.

The government in 1941 spent $130,000,000 to install certain new steel equipment wanted for special war work, and for 1942 approximately $414,000,000 in government funds has been allotted for the development of steel facilities. Plans for still larger additional expenditures by the government are under consideration.

An Institute survey showed that of 176 steel companies replying to its questionnaire, 134, representing more than 90 per cent of the industry's capacity, planned expansion or improvement of their plants this year.

The investment in new steel plants and equipment from 1935 through 1942 totals $2,207,000,000. From 1929 to 1939, the industry increased its capacity by over 10,000,000 net tons of ingots and since the beginning of 1939, the increase in capacity has been nearly 7,000,000 tons to the present total of approximately 88,500,000 tons. Total capacity at the beginning of 1929 was approximately 71,500,000 tons.

This additional capacity, built while the nation was at peace, was not fully employed until the war emergency arose. A reserve capacity thus was created, which is now proving of incalculable value in preventing shortages of war materials.

The steel industry, as a result of its expansion and modernization program, was able to produce nearly 83,000,000 net tons of steel last year.

INLAND SHIPBUILDERS: This minesweeper (top) the first naval vessel built in Illinois during the current war, slid into the Chicago River March 3. On March 5, Dravo Corp., at Pittsburgh launched its first sub-chaser, PC-573 (bottom) in the Ohio River. Because shipbuilding at Dravo was placed on a production line basis, the firm received the first "All Navy E," entitling every man in the plant to wear the symbol of excellence. After six months the plant will be reviewed again to determine if it is entitled to keep the award. The "All Navy E" award is made under the new plan recently inaugurated by the Navy whereby all Navy Bureaus make recommendations in each case to an official Navy Board of Awards.

AP Photo

Psychologists Aid British Firm's Fuse Case Output

• • • **Output of shell** fuse cases in a British munitions factory was increased twenty-fold after industrial psychologists suggested improvements in methods of working.

The job required careful hand-soldering of seams, and as the factory had lost most of its experienced workers, weekly output was only 1000 good cases, with several thousand rejects. But after various changes of which the most important was a systematic training scheme, based on careful study of hand and body movements, the output was raised to 20,000 cases a week, passed by the inspectors. Trained psychologists from Britain's National Institute of Industrial Psychology were given credit for the solution.

Small Business Leader on Ordnance Advisory Board

Chicago

• • • **The man** who started last summer to beat the drum for armament contracts for small companies, Frederick A. Virkus, has been appointed to the advisory board of the Chicago ordnance district to accelerate the placing of war business. As chairman of the Illinois division of the National Small Businessmen's Association, Virkus six months ago found that over 60 per cent of small firms faced shutdowns from priorities unless they obtained government business.

His appointment to the local ordnance staff is regarded as a sign of not only the willingness but the necessity of getting smaller manufacturers into the war effort.

As an indication of the way contracts are going to smaller concerns in this district, recent lettings revealed that in one week orders were given to 12 companies with 100 or less employees. Six contracts went to companies with 10, 20, 30, 35, 36, and 50 employees. Exactly 13 orders were awarded to businesses with 100 to 500 on the payroll. In addition, the local office has been urging subcontracting by the bigger contractors to the point where many have now sublet as much as 40 to 60 per cent of their contracts.

Plane Plant at Buffalo Begins Training Women

Buffalo

• • • **Initial steps** to overcome a threatened labor shortage later this year have been taken by Curtiss-Wright Corp. in its institution of a training school here for women. More than 50 registrations already have been received and instruction will be given soon in small parts inspection, checking sizes, inspecting riveting and welding.

Later, instruction may be provided women for riveting, sub-assembly work, drill-press operations and some final assembly work, plant executives announced. Courses will vary from two to six or more weeks and the women will be employed as the need arises. About 50 women now are working in the plane plant's cover department, sewing fabric.

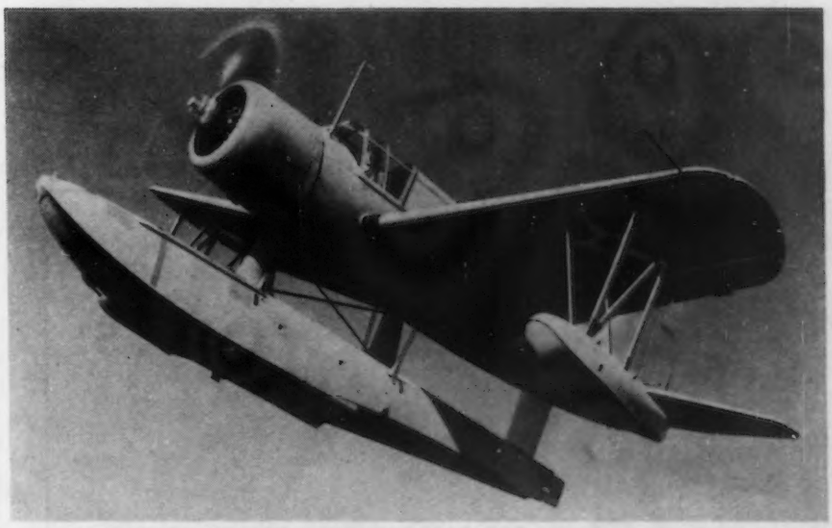
Steel Payrolls Rise to $118,785,000 in January

• • • **Payrolls of the steel** industry during January totaled $118,785,000, an increase of $22,551,000, or more than 23 per cent, over the total of $96,234,000 for January of last year, according to the American Iron & Steel Institute. In December, 1941, payrolls totaled $117,221,000. The total for January this year was only slightly below the record total, for any month, of $118,890,000 established last October.

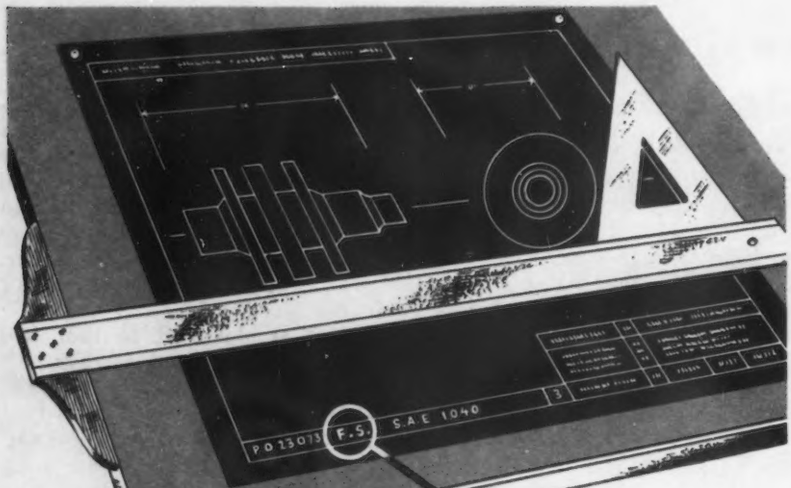
Wage-earning employees in the steel industry received an average of 99.2c. an hr., or nearly 15 per cent more than the average of 86.6c. an hr. for January of last year. In December, 1941, the average was 99.9c. an hr., the highest average wage ever recorded by the industry. Wage earners worked an average of 39.2 hr. per week in January, exactly the same average as in January, 1941. In December, 1941, wage earners averaged 38.2 hr. per week.

Total employment in the steel industry during January rose 5000 to a total of 651,000. This was 53,000 more than the 598,000 that were employed in January, 1941. In December, 1941, 646,000 were employed in the industry. The number of steel employees in January was only 3000 less than in last August, when the record of 654,000 employees was established.

PAPER TO RAILS IN 3 MONTHS: Designed, engineered, built and ready to run within three months after the receipt of the order, this is the first of a large order of Mikado (2-8-2) type locomotives under construction at the Baldwin Locomotive Works for the Army. The locomotives are designed for freight service, weigh about 175 tons, and are 60 ft. long.



THE KINGFISHER: This Vought-Sikorsky "Kingfisher" is a cruiser or battleship-based observation-scout, and according to the Navy has been effective in combating the submarine menace. The plane, equipped for attack, was recently commended by Secretary Knox on its performance.



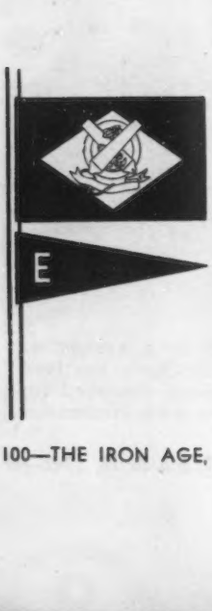
When You Write F.S. on the Drawing

When you finish up the drawing, write in the piece number and add F.S. SAE 1040, the "F.S." isn't just an afterthought. You've spent a lot of time on design, checked stresses and bearing values and worked out a number of associated parts.

You have a right to expect that the manufacture of the steel for the forging will be carefully controlled, and that the processes of forging and heat treatment of the piece will be in the hands of well trained experienced men.

Standard Steel has the equipment and the personnel to assure careful control from open hearth to finished forging.

Are you getting full value in *your* forgings? Specify Standard and be sure of it.



STANDARD STEEL WORKS

DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

Competitive Bidding No Longer The Rule

Washington

• • • **Competitive bidding for government war contracts is no longer the rule. Donald M. Nelson, WPB Chairman, last week ordered abandonment of advertising for bids.**

Mr. Nelson's order also announces policies to be followed in negotiating contracts. These policies are as follows:

In placing contracts, primary emphasis is to be put upon speed of delivery instead of the lowest price obtainable.

Contracts for standard and semi-standard articles relatively simple to make will be placed with smaller concerns, so that the facilities of the larger, more fully equipped firms may remain available for production of more difficult and complicated items.

Subject to these considerations, contracts are to be placed with concerns which need the smallest quantities of new machinery and equipment. This, WPB said, is designed to get most efficient use of the nation's machine tool capacity, and to bring into service as many idle tools as possible.

Allegheny Ludlum to Reward Men in Service

Pittsburgh

• • • **Allegheny Ludlum Steel Corp.,** and its subsidiaries, will reward and assist each employee now in military service or who may hereafter enter the service.

Entering military service, each will be given a check to cover the cost of National Service Life Insurance for one year in an amount equivalent to the group insurance coverage he had while working for the company. Each hourly rated or tonnage employee who has been employed for one year or more will receive a separate check as a military service honorarium, equivalent to two weeks' (80 hours') pay. Salaried employees who have been employed a year or more will receive a check for a month's pay. These arrangements are to be made retroactively effective also to employees inducted into service under the Selective Service Law, those entering service through the Reserve or the National Guard, and to those who volunteered subsequent to May 1, 1940.

Fine Ore Briquettes Aid Open Hearth Output

Pittsburgh

• • • **The consumption of** iron ore in the open hearth furnaces here has risen in direct proportion to the amount of pig iron used, which has also been increased as much as possible due to the shortage of scrap. The addition of the ore as an oxidizer reduces the carbon in the heat and at the same time adds to the iron content of the bath.

Some companies are also taking fine ore and making briquettes to charge in the open hearths which makes the handling easier and more economical.

In recent weeks some companies have experimented with the use of partially reduced iron ore which has been reduced in kilns. In this way the iron ore is still used as an oxidizer but at the same time adds more than the usual amount of iron to the bath.

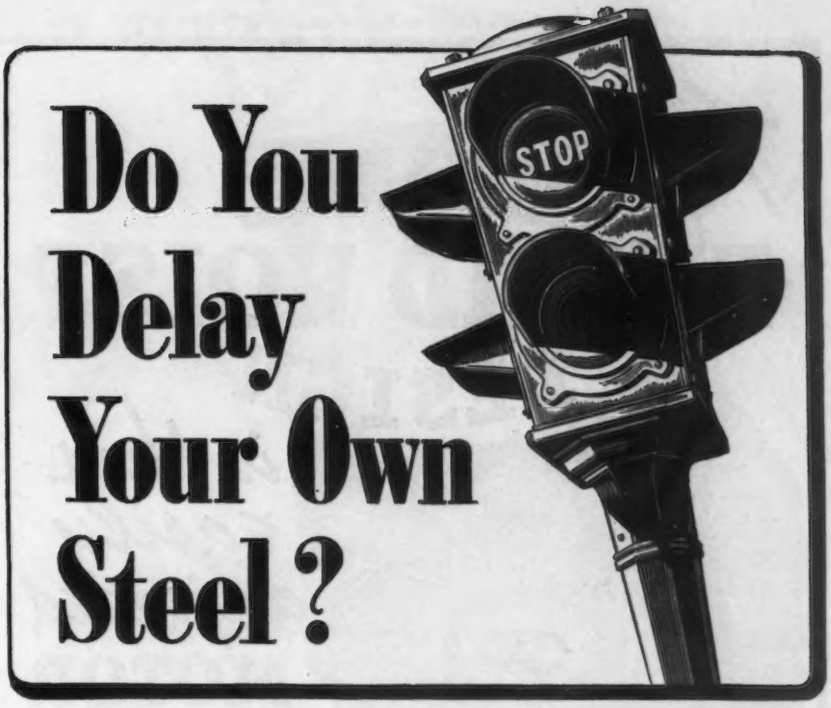
Still more interesting in recent weeks is the addition of iron ore to the bessemer converter in place of scrap or pig iron. In normal times scrap is charged in the bessemer converter to reduce the temperature but when scrap became scarce pig iron was used. However, with pig iron tight some companies are using iron ore in place of scrap or pig iron, thus reducing the ore and at the same time cooling the heat and adding iron to the charge.

These short cuts are typical of those being made every day by steel production men in order to produce the greatest amount of steel with existing equipment. Such methods will undoubtedly increase the consumption of ore to some extent but by an economical method which in the last analysis makes more steel for war needs.

Taylor-Winfield Corp. Will Spend $5,000,000

Warren, Ohio

• • • **Taylor-Winfield Corp.,** which recently acquired the Warren City Tank & Boiler Co. (see THE IRON AGE, Jan. 22) will expend some $5,000,000 to build an extension on to the main building of the old Warren City plant and to equip it with necessary machinery.



Do You Delay Your Own Steel?

Do you unwittingly hold up delivery of your own steel orders? Strangely enough, it's being done every day—even with a war going on!

In a typical instance, you might order steel to an Army specification—only to learn the "spec" covers 3 different variations of the same steel. Each variation has its own designation—the "spec" number alone is useless.

Unsure of your "spec", you're forced to delay placing the order. In the interval, the size you need is cleaned out of warehouse stocks by other steel users. Result—days, often weeks, of delay... searching and waiting for steel you might have had in hours!

Knowing your "specs" can save you untold trouble these days! Why not get the information beforehand? It's easy enough—competent Frasse personnel are glad to help. And talking about saving trouble—next time you need a "troubleshooter" on steel, try Frasse Technical Service, *Peter A. Frasse and Co., Inc., 17 Grand St., N.Y.C. (Walker 5-2200)* • *3911 Wissahickon Avenue, Philadelphia (Radcliff 7100—Park 5541)* • *50 Exchange St., Buffalo (Washington 2000)* • *Jersey City, Hartford, Rochester, Syracuse, Baltimore*

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SEAMLESS STEEL TUBING • COLD FINISHED BARS
STAINLESS STEELS • SAE ALLOY STEELS • DRILL ROD
COLD ROLLED STRIP AND SHEETS • WELDED STEEL TUBING

Quick Identification Of Government "Specs"!

This new Frasse data chart lists 17 Army and Navy "specs" for carbon steels—shows analysis of each class, with corresponding SAE number. Printed on tough cardboard stock, regular file size—can be filed, tacked on wall or slipped under glass for ready reference.

Send the coupon for your free copy today!

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Gentlemen: Please send me, without obligation, a copy of your new data chart listing 17 Army and Navy "specs" for carbon steels.

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THE **poorest** hoist will operate for a time. The **best** hoist after long service will require adjustments.

Means are provided in Euclid Hoists for making every needed adjustment accurately and quickly. Liberal dimensions of all parts lengthens the periods between adjustments. High quality materials permit making necessary adjustments repeatedly. This assures an unusually long period of efficient service.

Newest Euclid feature is the quickly accessible, easily adjusted motor brake. In operation, the liberally proportioned shoes, equipped with metal impregnated linings, respond instantly to the movement of a cam. Close adjustment can be made to stop the motor almost instantly or allow a more gradual stop.

A Euclid Cab Operated Hoist

Write for the Hoist Catalog No. 838 or the Euclid Crane Catalog if interested in this larger type of material handling equipment.

THE EUCLID CRANE & HOIST CO.

EUCLID, OHIO, *Suburb of Cleveland*

D. Edwin Gamble Joins WPB Ordnance Branch

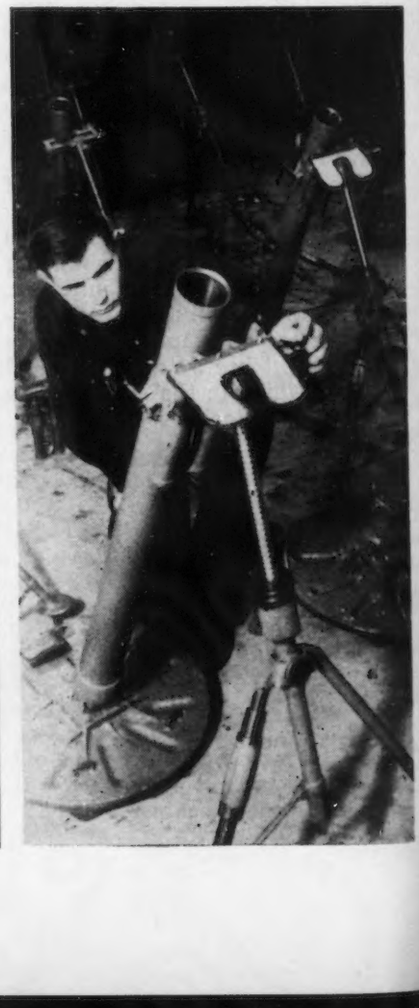
Washington

• • • **D. Edwin Gamble,** Chicago, vice-president and general manager of the Borg & Beck division of Borg-Warner Corp. has joined the staff of WPB's ordnance branch. Mr. Gamble has been associated with Borg-Warner Corp. since 1919 when he was made chief engineer of the Borg & Beck division. He also is chairman of the board of Pump Engineering Service Corp. and the Borg-Warner Spring Division, other affiliates of Borg-Warner Corp.

A native of Moline, Ill., Mr. Gamble is 54 years old. He learned engineering in the early automobiles shops and during the World War he was an engineer in the Army Air Service at McCook Field, now Wright Field, at Dayton, Ohio.

MINE THROWERS: These mine throwers are being examined before shipment to the Red Army on the German eastern front. They are used to throw land mines in front of moving enemy columns.

British-Combine Photo



Wide World Photo

A NAZI HUNTING FAMILY: Bombardier Doble, front, and his two sons, Gunner Fred and Lance Bombardier Leslie, a Nazi hunting family, are members of the same anti-aircraft gun team in London. The brothers are helping their father load a shell for practice firing. Before the war they seldom saw each other because of different occupations, but now they eat, work, and sleep together.

Seamless Tube Institute Launches New Program

Pittsburgh

• • • **The Seamless Steel** Tube Institute, Gulf Bldg., Pittsburgh, has modified its product development program inaugurated about a year ago. Specific steps include dissemination of technical data and useful practical information on tubing, with such help as members of the organization may be able to give users of tubing to the end that designers, engineers and fabricators who specify or use tubing may have the maximum help possible in saving time and producing more war material.

TO KEY MEN: Can You Use Sheet Metal Working Data for Defense — or Post-War Products?

FREE A "TELL-ALL" BOOK on Stainless Steel Fabrication

New men, new metals and new products. These are the triple-threats to top production as the Metal-Working Industry grapples with its strange task of "all-out" defense. Naturally fabricating problems will arise. This is where ARMCO can be of service to you—or your men.

Among the vital metals being used in defense work are ARMCO Stainless Steels. Perhaps some of your men are worried about how to fabricate these strong, rustless metals. Here then are the "tell-all" answers to these shop puzzlers.

The new book, "How to Fabricate ARMCO Stainless Steels," contains specific information on all the *latest* cost-saving methods.

Whether you are making defense equipment or looking ahead to peace-time products, both the new and experienced men in your shop will want a copy of this valuable book. It's offered free *only* to men who work or intend to work with flat-rolled "stainless." Please write on your firm letterhead.

The American Rolling Mill Company,
181 Curtis Street, Middletown, Ohio.

A LABEL KNOWN TO MILLIONS

MADE OF ARMCO STAINLESS STEEL

Republic's Statement Shows Inventories Lower

Cleveland

• • • **Analysis of** the operating statement of Republic Steel Corp. for 1941 indicates a 62 per cent drop in the value of the company's scrap inventory and a 73 per cent drop in the value of its pig iron inventory.

Speedier shipments of steel products to go into armaments were reflected by the fact the company's inventory of semi-finished steel dropped 38 per cent. Finished products and work in process declined 12 per cent below the inventory on Dec. 31, 1940.

The company's increased operations were reflected in higher inventories of ore, fuel, ferrous metals and alloys, rolls, molds, manufacturing supplies and miscellaneous raw materials.

Total payrolls for 1941 amounted to $137,079,363, an increase of 36 per cent over the $97,570,848 distributed to employees in 1940. In contrast to this earnings only increased 14 per cent to $24,038,339 from $21,113,507 in 1940. Taxes increased 256 per cent, rising to $57,277,622 in 1941, against $16,034,921 in 1940. Material costs and other expenses also increased disproportionately with the gain, amounting to 59 per cent, whereas sales and operating revenue for the year increased 58 per cent.

Depreciation, amortization and depletion charges for 1941 amounted to $13,349,887. This figure was the highest in Republic's history and reflects the record working of its mines plus depreciation upon a greatly increased plant account. Properties, plant and equipment were valued at $408,367,196 at the end of 1941, before reserves of $245,922,270 for depreciation, amortization and depletion.

Acme News Photo

NEW SUB-MACHINE GUN: A sub-machine gun, invented by 27-year-old Evelyn Owen, a former mortar mixer, is a new weapon for British soldiers. Fired from either the shoulder or hip, this 10½ lb. gun is designed so that hot barrels and spent magazines can be replaced in a few seconds. Its lower trajectory over great distances, deeper penetration, greater velocity, and light recoil make it extremely deadly. The gun is being mass-produced in Australia.

GENERAL FORREST—"the Fox" of Civil War fame—gave this prescription for winning battles: "Get there furstest with the mos' men". And it worked! Today he would be the first to modernize his famous slogan by including the crushing power of "mechanized equipment".

To get this equipment to our theatres of war quickly and in large quantities is the tremendous problem of the moment. Nothing must delay—even the slightest—the constant stream of material to our fighting forces.

In war, as in peace, the airless WHEELABRATOR is saving precious minutes and hours for hundreds of plants producing shells, bombs, tanks, airplane engines, guns, armament and other vital war necessities.

But it goes even further than saving time in this important work: It improves machinability and grinding—it lengthens tool and cutter life—it simplifies inspection—it conserves power, space and labor—it is a cost-saver in every respect.

REPEAT USERS

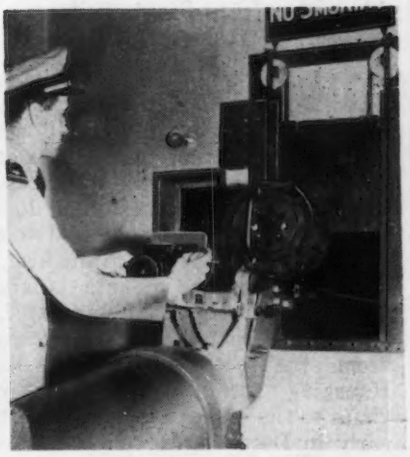
	NO. OF MACHINES
General Motors Corp.	82
Ford Motor Co.	57
Curtiss-Wright Corp.	38
International Harvester Co., Inc.	34
Firestone Tire & Rubber Co.	22
General Electric Co.	21
Timken Corporation	18
Natl. Mall. & Steel Castings Co.	18
Chrysler Corp.	16
Magnus Metal Div.	15
Borg-Warner Corp.	14
Campbell, Wyant & Cannon Fdy. Co.	12
Eastern Mall. Iron Corp.	11
Eaton Mfg. Co.	11
Kelsey Hayes Wheel Co.	11
U. S. Government	11
Associated Spring Corp.	10
Bendix Aviation Corp.	10
Spicer Mfg. Corp.	10
Wyman-Gordon Co.	9
Amtorg Trading Corp.	8
American Brake Shoe & Fdry.	8
Allis-Chalmers Mfg. Co.	7
Crane Company	6
Bethlehem Steel Corp.	6
Thompson Aircraft Prod. Co.	6
Fedders Mfg. Co.	6
Belle City Mall. Iron Co.	5
General Metals Corp.	5
Hollstead Iron Fdry.	5
Auto Specialties Mfg. Co.	5
Studebaker Corp.	5

and 146 other plants have from 2 to 5 Machines each.

WHEELABRATOR Airless ABRASIVE BLAST EQUIPMENT

AMERICAN FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST., MISHAWAKA, INDIANA



ANTI-DIVE BOMBER GUN: Firing tests, checked by a stop watch, determine the rate of fire of the Oerlikon, 20 mm. anti-dive bomber gun at the gun range of the U. S. Naval Ordnance plant operated by Hudson Motor Car Co. The gun, of Swedish design, is laid on its side for the test to duplicate as closely as possible the effect of overhead firing in actual combat.

COMING EVENTS

March 26 to 28—American Society of Tool Engineers, annual meeting, Hotel Jefferson, St. Louis.
April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.
April 15 to 17—Open Hearth Conference, Cincinnati.
April 15 to 18—The Electrochemical Society, spring convention, Nashville, Tenn.
April 18 to 24—Foundry and Allied Industries Show, Cleveland.
April 20 to 24—American Foundrymen's Association, Cleveland.
April 27 to May 1—American Mining Congress, Coal Show, Cincinnati.
May 11 to 13—American Gear Manufacturers Association 26th annual convention, Hershey, Pa.
May 25 to 28—National Association of Purchasing Agents Convention, Waldorf-Astoria Hotel, New York.
June 21 to 25 — American Water Works Association, Chicago.
Aug. 23 to 30—National Association of Power Engineers, New Orleans.
Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.
Sept. 22 to 24—Association of Iron and Steel Engineers, Pittsburgh.
Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore.
Oct. 12 to 16—National Metal Congress and Exposition, Detroit.
Nov. 30 to Dec. 5—National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York.

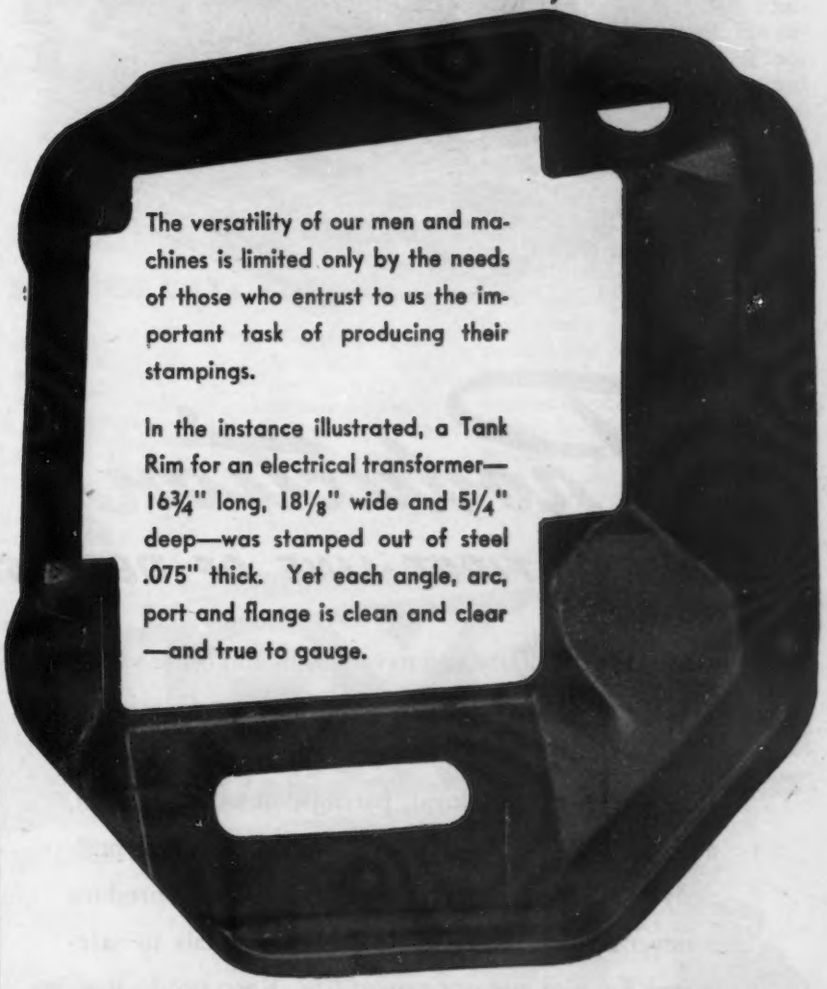
Enameling Furnaces Seen Usable for Heat Treating

Cleveland

• • • **The bottleneck in** heat treating and normalizing furnaces might be relieved by the use of idle furnaces at plants formerly engaged in producing porcelain enamel, according to an article in the February, 1942, issue of *The Enamelist*. The magazine cites a typical case where a Cleveland enameling plant undertook to anneal round bar stock and converted a 5 x 12 ft. electric furnace for this work.

A sloping frame in the furnace permitted the periodic withdrawal of annealed bars and the introduction of cold bars into the furnace. A slow cooling chamber was built adjacent to the furnace.

LIGHTER GAUGE STAMPINGS, too



The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—16¾" long, 18⅛" wide and 5¼" deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

Let us review your requirements.

PARISH PRESSED STEEL CO.
READING, PA.
PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

Production

AMERICA'S FIRST LINE OF DEFENSE

Back of our military and naval might and other visible defenses of our nation, is a productive America so great that even Americans fail to grasp its magnitude. It is an America of loyal, patriotic men and women, and machines — almost without number — that multiply the genius of man a thousandfold, and produce a never-ending stream of essential materials to safeguard America and our way of life. Keep production, America's first line of Defense, always moving forward.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Basic Open-Hearth Alloy Steel Billets and Slabs

FBI Reported Barring Hansgirg from Plant Visits

San Francisco

• • • **Unless a special** exception is made, Army orders for evacuation of enemy aliens from Pacific Coast zone will mean that the services of Dr. Fritz Hansgirg, whose process is the basis of magnesium reduction at the Permanente Metals Corp. plant, will be lost to the firm.

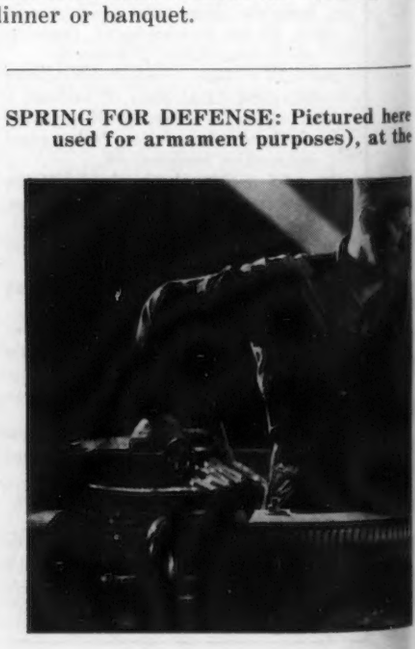
The sheriff of Santa Clara County, where the plant is located, stated that he had received orders from the FBI forbidding Dr. Hansgirg from making further visits to the plant. Since his arrest early in December as "en route to the United States immigration service" Hansgirg has been allowed to work at the plant daily, and returned to jail each night. Company officials declare they have been unable to determine the exact charges against the scientist.

Institute's Annual Banquet Cancelled; Sessions Slated

• • • **Because of the war,** the directors of American Iron & Steel Institute have voted to omit the evening banquet from the program of the 51st general meeting of the Institute, to be held at the Waldorf-Astoria in New York City, May 21, 1942.

Program of the meeting will consist of morning and afternoon sessions, at which industry problems will be discussed. This general meeting of the Institute will be the first to be held without an evening dinner or banquet.

SPRING FOR DEFENSE: Pictured here used for armament purposes), at the



Birmingham Seminar on Employment Relations Set

Birmingham

• • • **An employment relations** seminar will be held here March 23 and 24 under the joint sponsorship of Associated Industries of Alabama and the National Association of Manufacturers. The fundamental purpose of the two-day seminar, it is announced, is to suggest the most up-to-date methods of handling employment relations under a wartime economy and thereby to reduce the chances of misunderstandings which retard production.

Specific items to be discussed include wage problems, prevention and handling of grievances, determining labor policies and informing employees, and legal problems in employment relations.

Cast Pipe in Heavy Demand

Birmingham

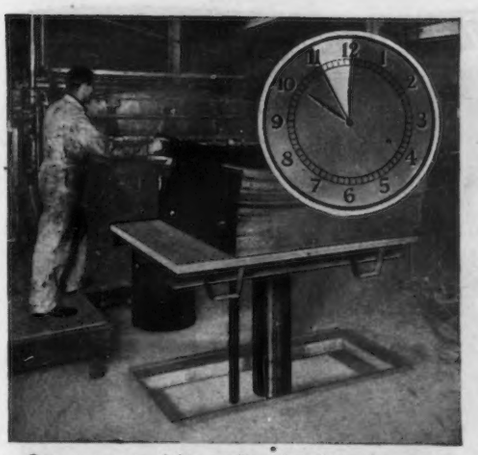
• • • **Demand for** cast iron pipe to meet needs at army camps, air fields and for other military construction, remains heavy at Birmingham. Cast iron pipe manufacturers are receiving a "fair share" of the pig iron allotment.

Narrow Plate Going for Ships

Birmingham

• • • **Considerable plate** is being made in some strip mills in this area. Although this plate is of narrow widths, it is being used for shipbuilding purposes.

is the hot coiling of a large spring (to be Muehlhausen Spring Corp. plant.



One man now doing easily what formerly was a back-breaking job for two men. By Materialift foot control, operator keeps 3-ton load at exactly right height and with hands free to feed press.

DEFENSE PLANTS
Save Vital Minutes and Manpower

Joyce Hydraulic Materialifts will give you faster production with fewer men. Use them for Machine Feed Tables; for Loading Platforms; for Short Lift Elevators; for Bridging Floor Levels; for Servicing and Assembling Heavy Motors. Simple to install. Powered by economical Joyce Electric Oil-Pumping Unit or an air compressor. Start and stop instantly by hand or foot control. Easily adapted to any vertical lifting job. They do away with expensive penthouse and overhead construction. Eliminate dangerous space-wasting ramps. Ideal for feed or assembly tables.

HYDRAULIC Materialifts

SEND FOR CATALOG NO. 600

showing seven styles of Materialifts and the many ways in which they are being used. Our engineers will submit complete plans for installation to meet your specific demands.

JOYCE
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ALL-PURPOSE JACKS

When you need Jacks, specify Joyce. There are more than 250 sizes and capacities in ratchet lever, screw and hydraulic types.

Built to lift from one to 50 tons; designed for many specialized services as well as all-purpose lifting. Ask your local Mill Supply house for Joyce Jacks, or write for Catalog No. 300.

No. 76-A

The ideal jack for general factory service. 5 to 20 tons cap.

THE JOYCE-CRIDLAND CO.
DAYTON, OHIO

★ THE STRONG RIGHT ARM OF INDUSTRY ★

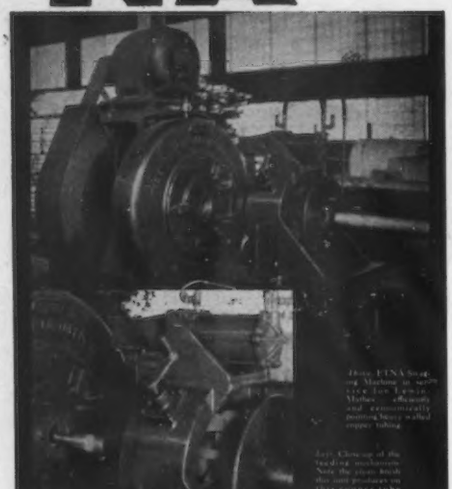
LEWIN-MATHES Got the right answer at

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

● **Tough Alloy, Steel Body — High Speed, Steel Edge — Patented Electric Weld**

If you want uninterrupted production . . . use these patented composite blades that cannot break . . . that stand up to the highest speed and heaviest feed any hack saw can attain . . . the positively unbreakable hack saw blades with the longest cutting edge—High Speed Steel.

Sold by Industrial Distributors evcrywhere

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 BLOOMINGDALE AVENUE CHICAGO, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York

McDonald Seen As Likely SWOC Head

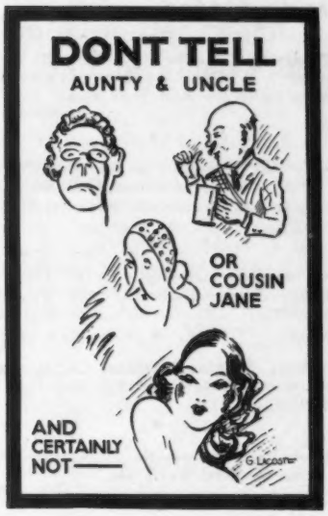
Pittsburgh

• • • **The SWOC will hold** its convention about May 14, with a good possibility of Pittsburgh being the location. There is a chance that Philip Murray, who has nurtured the organization since its beginning, may step down as chairman in order to devote more time to his duties as president of the CIO. Responsibilities under this latter job have increased substantially owing to the defense and war program, as well as Mr. Murray's inclusion on various national committees at different times. According to labor circles, the three runners-up for the position as head of the permanent SWOC, in case Mr. Murray steps down, are David J. McDonald, secretary-treasurer of SWOC, Van Bittner and Clinton S. Golden, board regional directors. According to reports, McDonald is considered to be the candidate who may receive the greatest amount of support from Mr. Murray.

In case the questions involving wage increases, check-off and closed shop in the steel industry are not settled by the time of the convention, they will probably represent the prime discussion before the delegates. The organization is pledged to no-strike action for the duration, although in recent weeks some sporadic walkouts have occurred, despite the fact that the national office has refused to recognize them.

The old question of absorbing the Amalgamated Association of Iron, Steel and Tin Workers which was used as a starter in organizing the steel industry in 1936 will come up for action. The Amalgamated, although allowing its name to be used in chartering new SWOC units, has nevertheless remained a separate organization with approximately 10,000 members, as against more than 500,000 claimed by the SWOC.

The Amalgamated has already voted to merge with the SWOC but such a move involves the disposition of financial assets and deficits, as well as certain death and other benefits carried on by the Amalgamated for years.



Great Lakes Ore Movement Of 92 Million Tons Asked

Buffalo

• • • **Great Lakes** vessel operators are being asked by the government to move 92,000,000 tons of iron ore during the 1942 navigation season instead of 85,000,000 tons, Capt. T. Howard Saunders of Buffalo, chairman of the executive committee of the International Shipmasters' Association, said this week.

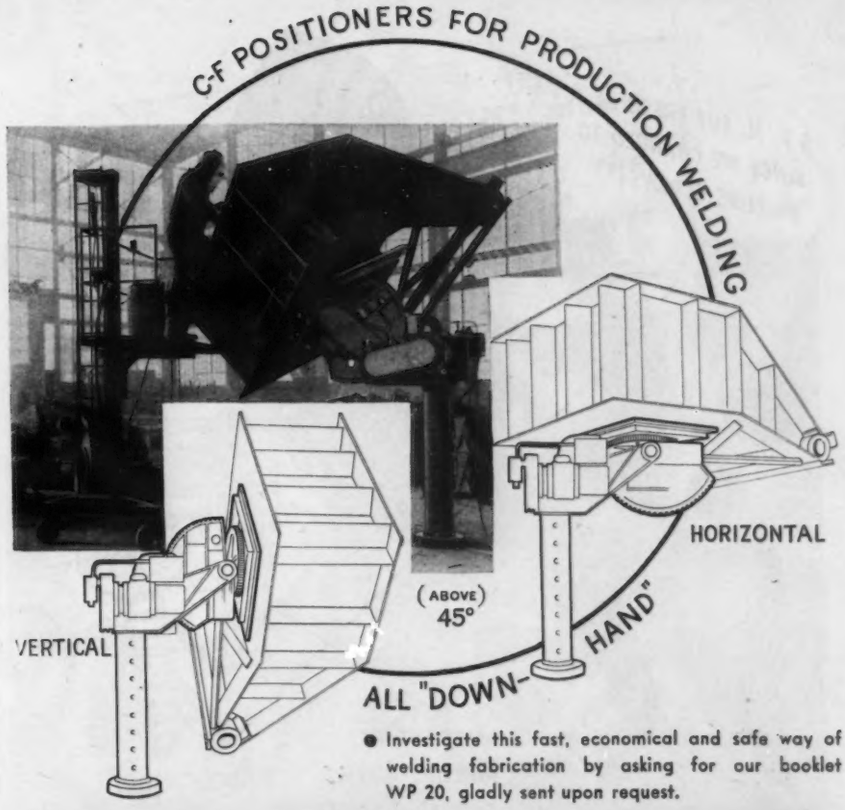
"We had set the 1942 mark at 85,000,000 tons but the steel plants are consuming ore at the rate of 86,000,000 tons a year," said Capt. Saunders. "This will mean an even bigger job, but with good weather and an early start we may be able to do it. In 1943, vessel operators will be asked to move about 105,000,000 tons of ore."

The summer loading period will extend from May 1 to Oct. 1 this year compared with May 16 to Sept. 16 formerly, Saunders announced. At present, ice in Buffalo Harbor is 20 inches thick.

Jackson Blast Furnace Will Be Air-Conditioned

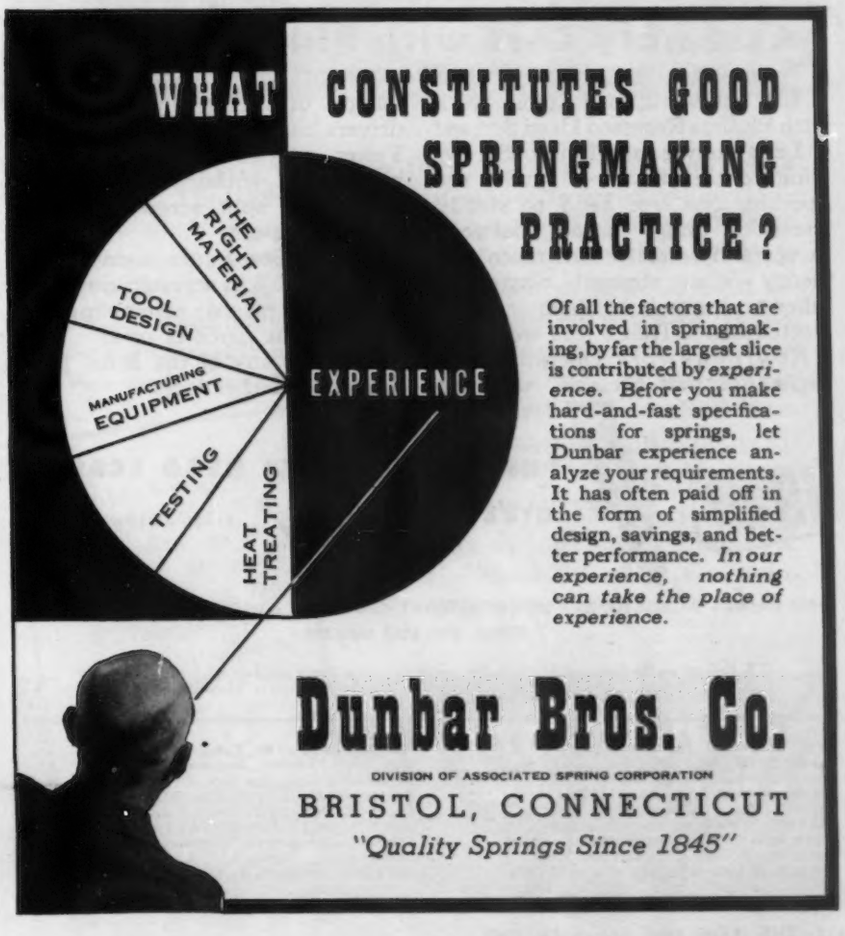
Syracuse, N. Y.

• • • **Air conditioning,** credited with increasing blast furnace production, will be utilized to assist output of silvery pig iron, it was announced recently by J. I. Lyle, president, Carrier Corp., following the signing of a contract with the Jackson Iron & Steel Co., Jackson, Ohio, for the air conditioning of one of the few high silicon content, or silvery pig iron, furnaces in the world.



● Investigate this fast, economical and safe way of welding fabrication by asking for our booklet WP 20, gladly sent upon request.

CULLEN-FRIESTEDT CO.,
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS


WHAT CONSTITUTES GOOD SPRINGMAKING PRACTICE?
THE RIGHT MATERIAL
TOOL DESIGN
MANUFACTURING EQUIPMENT
TESTING
HEAT TREATING
EXPERIENCE
Of all the factors that are involved in springmaking, by far the largest slice is contributed by *experience*. Before you make hard-and-fast specifications for springs, let Dunbar experience analyze your requirements. It has often paid off in the form of simplified design, savings, and better performance. *In our experience, nothing can take the place of experience.*
Dunbar Bros. Co.
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"

Less Fatigue • Power Driving • Fewer Operations = 50% Less Assembly Cost with Phillips Screws

It's less work to do more work with Phillips Recessed Head Screws!

Let's analyze that. Phillips Screws cling to the driver — giving the operator one free hand to steady the job. Snug contact between driver and recess means more efficiency — no strength wasted as when trying to hold blade driver in slotted head. That's *less work*.

Now: *more work*. Operators have higher output because, with no danger of driver slippage, power drivers can be used in more cases. Fewer operations, too: no pilot holes, no withdrawing crooked screws, no split screw heads, no burrs to file off.

Phillips Screws are saving manufacturers 50% in screwdriving time, which also means: assembling *two* parts for the *price* of *one!*

Write to any of the firms listed below for further facts.

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

Trade Notes

Progressive Welder Co., Detroit, has appointed V. A. Chern its sales and service representative in the New York area.

•

American Swiss File & Tool Co., Elizabeth, N. J., has appointed Barnard S. Meade sales representative, with headquarters in Elizabeth.

•

DeVilbiss Co. has moved its St. Louis sales and service branch office to 2737 Washington Avenue.

•

Superior Marking Machines Co. is now located in new quarters at 675 Grand Avenue, Ridgefield, N. J.

•

Metal Parts Corp., Chicago, has changed its name to Metal Parts Co.

•

Acme Pattern & Tool Co., Dayton, Ohio, and the **Production Products Co.**, Dayton, engineers of tooling programs, will be represented in New York by W. E. Weaver, Empire State Building.

•

Sullivan Machinery Co., Michigan City, Ind., has appointed L. C. Rhodes, formerly manager of its Butte-Spokane district, as manager in San Francisco of its Pacific Coast territory. Robert T. Banks will manage the Butte-Spokane district, and will remain at his headquarters in Salt Lake City.

•

F. W. Marshall & Co., pig iron distributers in the eastern Pennsylvania area, have moved their offices to 1306 Philadelphia Bank Building, Philadelphia. For the past 30 years, the company has maintained its offices in the Pennsylvania Building.

•

Chain Belt Co., Milwaukee, has appointed Pecaut Industrial Supply Co., 1819 E. Fourth Street, Sioux City, Iowa, as distributer of Rex construction machinery in the Sioux City area.

•

Isthmian Steamship Co., a subsidiary of United States Steel Corp., has moved its New York staff to new offices at 71 Broadway where headquarters of the parent corporation are located.

•

Superior Marking Machines Co. has moved to a new office and plant at 675 Grand Avenue, Ridgefield, N. J.

•

Olofsson Tool & Die Co., Lansing, Mich., has moved to larger quarters at 738 Porter Street.

•

Better-Bilt Door Co., formerly of 115 West Avenue, Jenkintown, Pa., has moved its plant and offices to White Horse Pike, Egg Harbor, N. J.

•

Standard Pressing Machine Co., 1841-1843 Pitkin Avenue, Brooklyn, will soon move to larger quarters at 204-206 Newport Street, Brooklyn.

•

Pomona Pump Co., manufacturers of vertical pumps, has purchased Westco pump division of Micro-Westco, Inc., Bettendorf, Iowa, which will be operated as Pomona Pump Co., Westco Division, at 2621 Locust Street, St. Louis, Mo., and manufacture continued from the St. Louis plant of the Pomona Pump Co.

Tool Hoarder Found In Cleveland Plant

Cleveland

• • • **Complaints by workers in a certain defense plant here of an insufficiency of working tools resulted in a tool round-up which disclosed that one worker had a nest of 200 tools in his locker for his own use. The one-man tool supply has now been distributed to all the workers and everyone is happy again.**

Conspiracy Charged In Hardware Prices

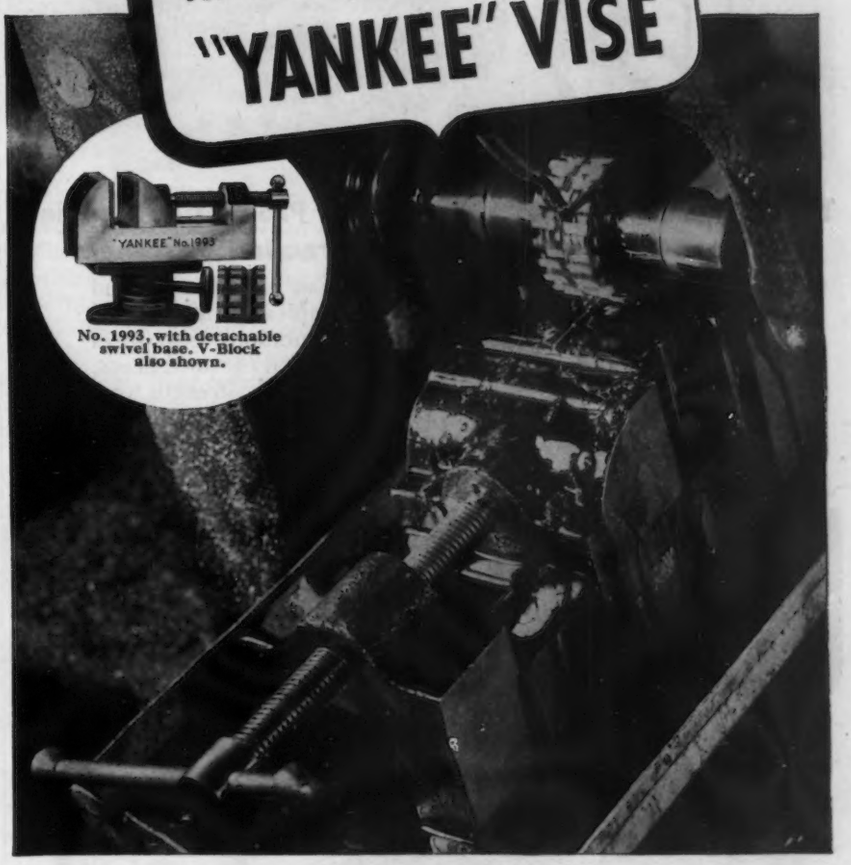
Los Angeles

• • • **Charging a conspiracy** to fix and maintain wholesale prices of hardware and metal products, an indictment has been returned by the Federal grand jury against 12 steel warehouses operating in southern California and against 11 individuals, executives of the warehouses and the local warehouse association.

The accusation, it is believed, is based upon the sheets issued by the local warehouse group reporting current prices and trade practices. If the case can be sustained against the Los Angeles group, it is considered likely that similar action may be taken against warehouses in other parts of the country where such practice has been followed. Steel warehouse prices in the Los Angeles area are not generally considered by the trade to have been out of line prior to the OPA price freezing, and were not affected by the freezing relatively more than in other sections.

Listed as defendants in the Los Angeles suit are Union Hardware & Metal Co., California Hardware Co., Harper & Reynolds Corp., Ducommun Metals & Supply Co., Hoffman Hardware Co., American Wholesale Hardware Co., Los Angeles Heavy Hardware Co., Percival Steel & Supply Co., Earle M. Jorgensen & Co., A. M. Castle & Co., Western Metal Supply Co., Emil Brown & Co., L. B. Yeaton, Edward H. McGinnis, Walter W. Coulson, A. W. Lohn, Sydney T. Exley, Jr., Byron J. Badham, George Anderson, Emanuel Jungquist, Earle M. Jorgensen, John L. Robertson and Emil Brown.

FEWER OPERATIONS mean FASTER MILLING with the "YANKEE" VISE



No. 1993, with detachable swivel base. V-Block also shown.

Cut out waste motions—they are costly and time-consuming! The "Yankee" Vise is designed to speed production. Once work is squared on face plate or machine bed it *stays* squared because the sides, front end and base of the "Yankee" Vise are accurately machined. If work must be moved from bench to drill press or milling machine, it can be done quickly and easily without realignment. The same vise can be used for round stock, simply by inserting a hardened steel V-block that's furnished as standard equipment. All these "Yankee" features save time and production costs.

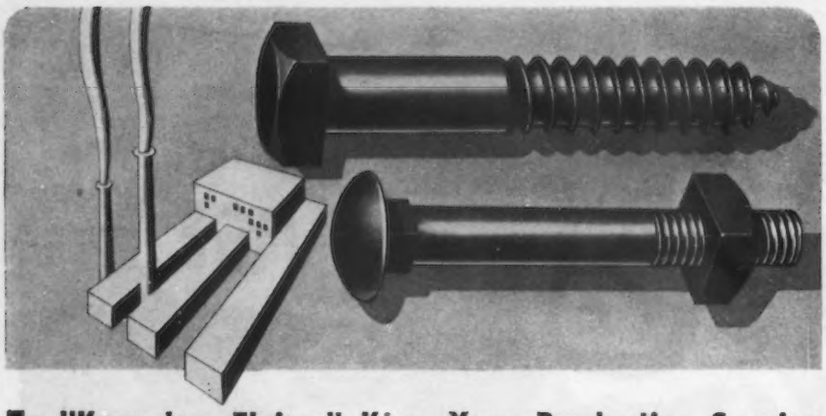
Order from your supply house . . . or write North Bros. Mfg. Co., Dept. IA3, Phila., Pa., U. S. A.

"Yankee" Vises are made in four jaw widths and two styles. No. 991—1½"; No. 992—2"; No. 993—2¾"; No. 994—4". These same sizes with the detachable swivel base feature are Nos. 1991, 1992, 1993, 1994.

"YANKEE" TOOLS

make good mechanics better

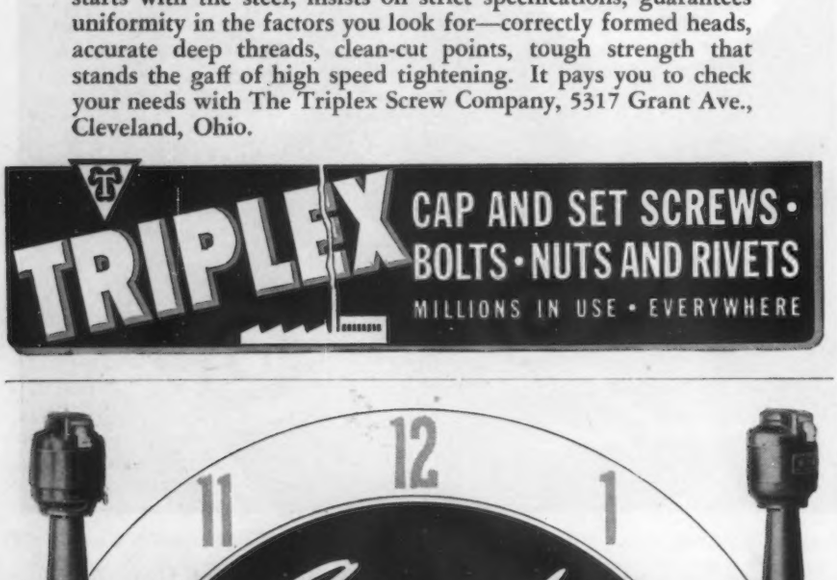
NORTH BROS. MFG. CO., Phila., U.S.A.



To "Keep 'em Flying," Keep Your Production Soaring with TRIPLEX Quick-Fitting Threaded Fasteners

Make every minute count. Let Triplex Cap Screws, Bolts and Nuts help you avoid assembly delays. Triplex quality control starts with the steel, insists on strict specifications, guarantees uniformity in the factors you look for—correctly formed heads, accurate deep threads, clean-cut points, tough strength that stands the gaff of high speed tightening. It pays you to check your needs with The Triplex Screw Company, 5317 Grant Ave., Cleveland, Ohio.

TRIPLEX CAP AND SET SCREWS • BOLTS • NUTS AND RIVETS
MILLIONS IN USE • EVERYWHERE



THE RUTHMAN MACHINERY COMPANY
1821 READING ROAD CINCINNATI, OHIO, U.S.A.

War Contracts Awarded

• • • **Below is a New York State list of government contracts recently awarded, some of which may require subcontract work. If you are a New York state manufacturer and are interested in obtaining work on a subcontract basis, write, don't telephone, your nearest WPB Contract Distribution office. In making inquiries concerning any of the following items, please refer to the letters and numbers given in the second column.**

Contract Item	Firm
Machines, laundry	NAF-2402
Hoist	NAF-2403
Electrodes	NAF-2405
Electrodes	NAF-2406
Electrodes	NAF-2407
Sets, threading	NAF-2408
Valves	NAF-2412
Generators	NAF-2413
Engine lathe	NAF-2502
Blades, hack-saw	NAF-2504
Shields, welders'	NAF-2512
Turbo generator sets	NAF-2515
Instruments	NAF-2516
Plants, refrigerating	NAF-2518
Chains & fittings	NAF-2519
Electrodes, welding	NAF-2521
Coolers, fountains	NAF-2522
Steel-clad galley	NAF-2525
Pencil sharpeners	NAF-2526
Taps, hand	NAF-2527
Electrodes, welding	NAF-2530
Buckles, etc.	NAF-2601
Laundry equipment	NAF-2602
Forgings	NAF-2603
Machines, tool	NAF-2701
Hoists, chain	NAF-2703
Hoists, chain	NAF-2704
Diesel engine	NAF-2705
Cable, electric	NAF-2706
Tanks	NAF-2709
Generator sets, diesel	NAF-2711
Trucks, fire & rescue	NAF-2712
Toasters, electric	NAF-2719
Pliers & nippers	NAF-2721
Wire rope spreaders	NAF-2801
Wire rope spreaders	NAF-2802
Cylinders	NAF-2806
Buoy	NAF-2807
Fans, spare parts sets & plans	NAC-11504
Steel valves	NAC-11505
Spare parts for Grumman "Martlet 1" airplanes	NAC-11506
Scintilla magnetos	NAC-11507
Gyro compass parts	NAC-11508
Diesel engine & spare parts, etc.	NAC-11509
Compasses	NAC-11511
Shears	NAC-11512
Electric broilers, steamers, etc.	NAC-11602
Electric copper cable	NAC-11604
Dishwashing machines	NAC-11606
Power analyzers	NAC-11610
Dishwashing machines	NAC-11612
Automatic fasteners	NAC-11706
Dental arch fracture wire	NAC-11707
Platform skids	NAC-11711
Copper-nickel alloy tubing	NAC-11801
Pressure reducing valves	NAC-11806
Pressure reducing valves	NAC-11807
Spare blading & turbine parts	NAC-11808
Pressure reducing valves	NAC-11810
Burettes	NAC-11811
Electric furnaces	NAC-11907
Electric furnaces	NAC-11910
Electric fans	NAC-11911
Liquid level indicators	MC-F1201
Feed water heater drain cooler	MC-F1202
Smoke detecting & fire extinguishing system	MC-F1203
Air operated automatic control system	MC-F1204
Galley & pantry equip.	MC-F1205
Air reducing valves	MC-F1206
Radio equipment	MC-F1208
Oil & water separators	MC-F1210
Joiner doors, hardware, name & number plates & notice frames	MC-F1213
Emergency generator sets	MC-F1214
Fathometers	MC-F1215
Manhole guards, door frames & parels, mooring bitt bases strainer plates	MC-F1220

Largest Great Lakes Vessel Launched at Detroit

Detroit

• • • **The ore carrier** Leon Fraser, largest vessel ever built on the Great Lakes, was launched here recently at the River Rouge shipyards of the Great Lakes Engineering Works, of Ecorse, for the Pittsburgh Steamship Co., United States Steel Corp. subsidiary.

The vessel was sponsored by Mrs. Leon Fraser, wife of the president of the First National Bank of New York, for whom the ship was named. Mr. Fraser is a member of the board of directors and a member of the finance committee of U. S. Steel.

The ship is an important addition to the company's present fleet of 68 ore carriers, the largest fleet on the lakes. It is one of five new vessels which will go into service this season to bring the fleet to a total of 73 vessels, the other four being on the ways now, two at the Great Lakes works, and two at the yards of American Shipbuilding Co., Lorain, Ohio. With a length of 639 ft., breadth of 67 ft. and depth of 35 ft., each of the new ships will be capable of hauling 18,600 long tons of ore per trip at 24 ft. draft.

Assuming available draft of 22 ft., the trip capacity of the Pittsburgh fleet will be increased about 82,000 tons, which totals about 2,450,000 tons per year.

U. S. Steel Ships 1,616,587 Tons During February

• • • **Finished steel** shipments by subsidiaries of United States Steel Corp. during February totaled 1,616,587 net tons, against 1,738,893 net tons shipped in January and 1,548,451 tons shipped in February, 1941.

The decline in February shipments from January was entirely the result of the shorter month, since the daily average of steel products shipped in February was 57,735 tons, compared to 56,093 tons shipped daily during January.

For the current year to date, shipments were 3,355,480 net tons, up 124,575 net tons from the total shipments of the same period of 1941 which totaled 3,230,905 net tons.

To the Pacemaker in Wire
A NAVY "E"!

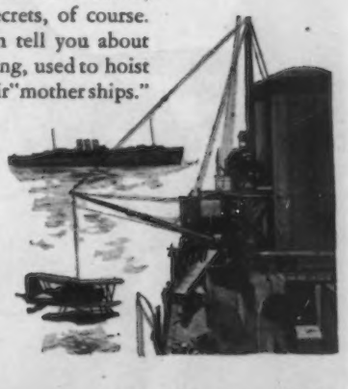
7000 VOICES SPOKE in the person of William A. Anderson, president of Roebling, who received the flag of the Bureau of Ordnance and Navy "E" Pennant on behalf of more than 7000 Roebling employees January 22, 1942. The reward was made for excellence in production for the war effort.

AN ENEMY BOMB fragment is swallowed by the Roebling open hearth furnaces, from the hand of a Naval officer . . . to be made into steel for the Navy, and returned with interest to those who menace American liberty.

FOR PULLING TOGETHER, doing the job the American way, every Roebling employee received an "E" button. In the group at right six employees with a combined service record of 256 years receive the "E" from a Naval officer.

"SHOW YOUR COLORS!" Proudly, John C. Mundt, Roebling employee with a 50-year service record, breaks out the two Naval award flags over the Roebling plants. Beneath him, the rumble of machinery continues unbroken, producing for American defense at breakneck speed.

WIRE GOES TO SEA in hundreds of forms, many of them Naval secrets, of course. But among those we can tell you about is this stout wire rope sling, used to hoist seaplanes back aboard their "mother ships."



JR ROEBLING

ROEBLING

The Pacemaker in Wire Products

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY • Branches and Warehouses in Principal Cities

Monthly Reports on Conversion Required

Washington

• • • **American industry** was ordered March 10 by WPB Chairman Donald M. Nelson to begin sending WPB a month-by-month report on its conversion to war work.

In a letter to manufacturers he enclosed a three-page form, WPB-732, to be filled out and returned for tabulation by March 25. The reports will give a general overall picture of the war and civilian work currently being done in the nation's industrial plants and the plans for future utilization of these facilities.

Plants will list the principal classes of war or civilian products produced during previous months together with the total value of shipments and unfilled orders. The estimated man hours worked by wage earners also are requested. These shipments will be classed as war work (prime contracts and orders with AA to A-1 preference ratings) or other work.

Peak operations, employment and the value of war work shipments, together with the estimated man hours, and wage earners in the peak month must be shown.

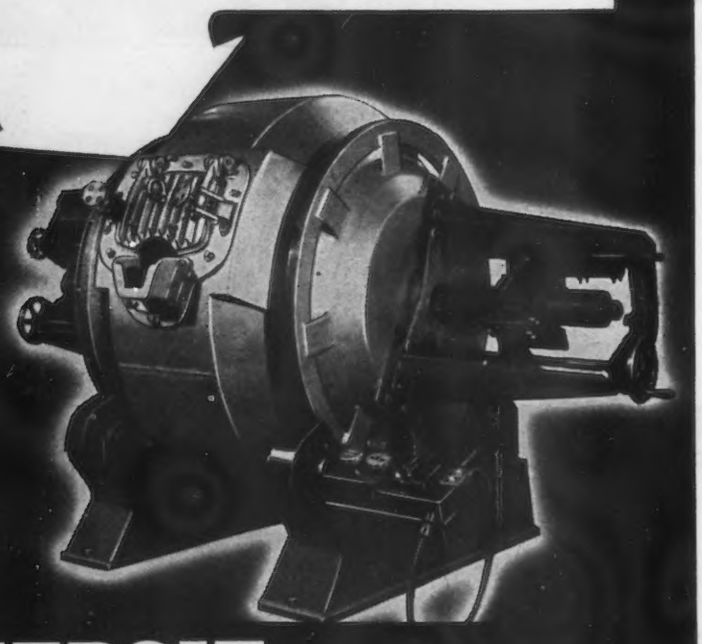
Machine tool reporting is required showing the monthly period of operation. Idle tools must be listed.

FROM METAL TO ARMS.. *Faster!*

The Detroit Furnace is a fast melting unit. Faster melting speed means a higher rate of production with less labor and greater overall economy. Detroit Rocking Electric Furnaces are being demanded, in ever increasing number, by armament makers.

Working 8, 16 and 24 hours a day, Detroit Furnaces are today melting all types of brass, bronze and other copper alloys; high speed, stainless, heat and corrosion resistant steels; alloy grey irons, short cycle malleable, nickel, monel metal and many other special alloys both ferrous and non-ferrous for America's Arms production.

Not only for productive speed but also for lower metal losses, higher average quality of product, saving in floor space and plant equipment, you simply cannot beat a Detroit Furnace. Write today for further facts.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

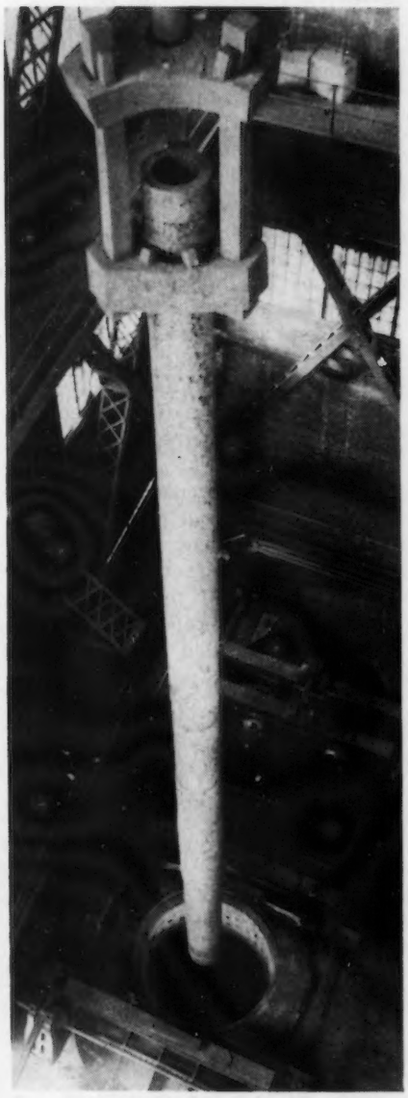
Industrial Milestones

• • • **Fifty years** of service to the petroleum industry have seen greater and greater demands heaped on oil well suppliers, while technological improvements have made possible the tapping of new oil sources and the operating of wells more efficiently. That's the story behind the golden anniversary announcement by J. C. Axelson, president and general manager of the Axelson Mfg. Co.

In 1892, on an original capital investment of $1200 scrimped from wages, a small iron works in the then country town of Santa Ana, Calif., was purchased by two Axelson brothers, C. F., a machinist; and G. A., a molder.

Today the sons of the founders are operating a company whose scope of oil field service is literally described in their paraphrased slogan: "The sun never sets on Axelson pumps and sucker rods." And in 1942 the Axelson foundries, machine shops, and assembly lines are supplying American war industry—for the second time—with essential production and maintenance equipment. Developed during the first World War, Axelson's line of machine tools, heavy duty lathes and accessories are under all-out production to supply America's 1942 Victory Program.

Simultaneously, the company this year will produce a large volume of aviation parts for Allied warplanes, according to vice-president D. F. Axelson.



BETHLEHEM IN HIGH GEAR: Facilities that more than double Bethlehem Steel Co.'s already large capacity for heavy forged products for the Navy are now coming into production. Gun forgings, armor, shells, ship shafting and torpedo forging are being turned out at an ever increasing rate. Bethlehem, one of the great war program companies, now has five times its steel making capacity of the First World War. Above, a tube for a big gun is lowered into a heat-treating furnace at a Bethlehem plant.

Wheeling Steel Expansion Involves $18 Million

Pittsburgh

• • • **According to Wheeling** Steel Corp.'s annual report, the WPB has approved an $18,000,000 expansion project for the company and negotiations for the financing are now being carried out with the DPC.

The project covers the construction of 78 additional coke ovens, a 1200-ton blast furnace and auxiliary equipment, 150-ton open hearth furnace, a row of soaking pits, and certain plate finishing facilities and equipment, all to be located in Ohio.

Also included in the program is the replacement of two cupolas and rebuilding four stands of the present continuous skelp mill in West Virginia, as well as additional coal mining machinery and coal barges.

As indicated previously in THE IRON AGE, the company is to install facilities for bonderizing black plate and electro tin plating of black plate.

IF IT'S SURFACE GRINDING . . .
You Need ABRASIVE !

←No. 3-B Specifications—This horizontal spindle, reciprocating table grinding machine with mechanical feeds handles work up to 24" long x 8" wide x 12" high under 10" wheel. Normal wheel speed 2290 rpm. Automatic longitudinal and transverse feeds. Table hand wheel automatically locked-out when power feed is in. All hand wheels located in most natural position for operator.

No. M-3—designates the No. 3-B with built-in motor on spindle. Write for catalog.

No. 34 Specifications—A vertical spindle, reciprocating→ table grinding machine with automatic downfeed. It grinds work any size up to 24" long x 8" wide x 12" high. Takes 5" dia. Type 2 steel back cylinder wheel. Normal speed 3050 rpm. Write for catalog.

Rotary Chuck—Individual motor driven rotating grinding attachment with 12" magnetic chuck is available for this machine. Particularly useful for accurately grinding small parts.

←No. 1½ Specifications—An unusual capacity—work up to 15" long x 10" wide x 12" high—features this horizontal spindle, reciprocating table hand feed grinding machine. Takes a 12" dia. wheel normal speed 1750 rpm. More useful on many jobs than automatic machines costing twice as much. Write for catalog.

Accessories—Motorized dust exhauster or wet grinding attachment can be furnished for either the 1½ or 3-B machines. Also available are radius and angular truing devices, plain and swivel vises, etc. Ask for information.

ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE, RHODE ISLAND, U. S. A.

WRITE OR PHONE NEAREST DEALER

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SWIND MACHINERY CO.
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Baltimore Tuxedo 0104
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BLACKMAN & NUETZEL MACH. CO., INC.
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HENES-MORGAN MACHINERY CO. LTD.
Los Angeles Jefferson 7185

JENISON MACHINERY CO.
San Francisco

Freight Rate Rise March 18 Creates Pricing Problems

Washington

• • • **Revision of OPA** price schedules is under study as the result of the increased railroad rates recently granted by the Interstate Commerce Commission. The higher rates will become effective on March 18. In all cases it is said that the problem relates to the absorption of the added charges by either the seller or buyer rather than to the raising of the ceiling prices. The latter is probable only in individual cases. Higher ceilings, however, will definitely be a matter of consideration if increased wage demands are granted either in part or in their entirety an outstanding instance of which are those made by SWOC of the steel industry in a case now pending before the National War Labor Board. SWOC is asking a $1 a day increase.

One of the schedules that will be considerably effected by the rate increase is scrap because of the important factor that rail charges constitute in the delivered price. Absorption of the 6 per cent increase will be required of either the dealer or the mill.

In steel warehouse merchandising there is a dual pricing system and the adjustment for absorption of the 6 per cent increase is said to involve a difficult problem, but in any event it is reported that the buyer will be called upon to absorb the increase.

In steel mill products it was stated since under the basing point system the price is on a delivered basis, thus including freight charges, the problem will not be difficult. However, it is understood that absorption will fall on non-basing point mills so far as it covers the difference in charges made by basing point mills.

This is also true of pig iron. It has been indicated that while revision of the pig iron schedule will not be necessary or will be only of a minor character, individual instances calling for exemption for certain furnaces may develop, particularly where such furnaces now must absorb considerable freight.

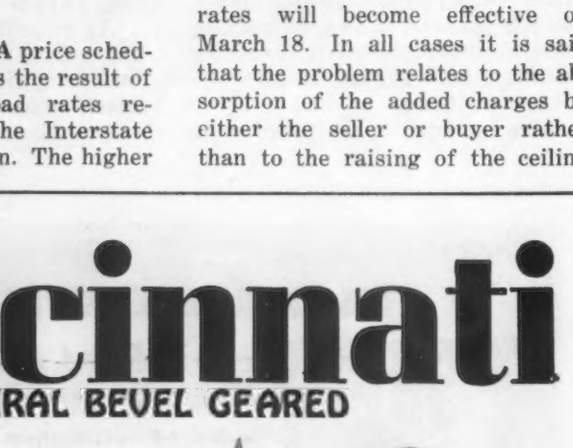
It is not expected that much, if any, revision of the coke schedule will be made.

It has been pointed out that in the Connellsville Pa., region, where the great bulk of beehive coke is made, coal is nearer to the ovens for the most part, involving little or no transportation. The added rates on coke, it is believed, will, aside from possible individual exemptions, be absorbed by producers.

Cincinnati

SPIRAL BEVEL GEARED

HYPRO VERTICAL BORING MILLS



Engineered to combine speed, flexibility and ease of control with power, rigidity and accuracy to meet the requirements of today.

Designed for:

1. Centralized Pendant Station Control which provides operation of the entire machine from the operator's position.
2. Individual feed and rapid traverse boxes with independent Rapid Traverse Motors for each head, making it possible to control each head independent of the other.
3. Automatic lubrication provided to all feed boxes, table drive, heads and saddles requiring no attention on the part of the operator.

In these competitive times, you need this kind of equipment. Full particulars sent upon written request.

Sizes—54", 64", 72", 84", 100", 120", 144".

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

Effect of Freight Boost on Steel Earnings to be Varied

Pittsburgh

• • • **The forthcoming** boost in freight rates, amounting generally

to 6 per cent, is expected to produce various results in the steel industry's earnings picture, depending on the size, location, and type of production of the steel companies involved.

All large integrated steel companies will face definite increases in basic raw material costs amounting to 3 per cent of the current transportation charges, with the exception of iron ore on which there has been no increase for transportation. Major raw materials which are mined will cost approximately 3 per cent more in transportation cost, while some products such as oil, bricks, etc., used in maintenance work and production of steel will have their costs increased 6 per cent.

While such advances may be small in comparison to total steel production costs, nevertheless they will be a definite factor in a long series of increases which have occurred since war began.

With freight rate increases effective soon on the transportation of finished steel products, large integrated mills with various basing points will probably be the least affected. On dislocated tonnage the increases will be borne by the steel consumer, whereas on normal steel distribution the increases will be effective in direct proportion to the amount of freight absorption assumed by the steel companies.

Most severely affected by the transportation increases will be the small steel plants having one location or one basing point on various products in which the shipments are made to distant locations.

However, some small steel companies not at a basing point will not be adversely affected, depending upon location and distribution of shipments. In other words, some small companies not at a basing point, when shipping within an area outside of a basing point location, could under certain conditions gain by the increase since the freight rate from their plant to the point of consumption may have been increased by a greater amount than the freight rate from their plant to the point of consumption. Such a situation, however, will not necessarily be general since this advantage will be more or less offset by the fact that these companies also will be shipping to basing point areas where the freight will have been increased.

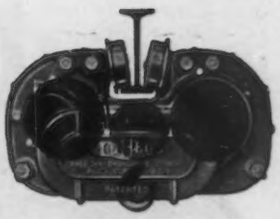
The 6 per cent increase in freight rates for iron and steel scrap is expected to restrict the areas which can benefit from remote scrap supplies unless the OPA makes some change in the "spring board" allowance for bringing in distant scrap or unless the broker or dealer absorbs the increase which in many cases will run from 25 to 50 cents a ton on scrap coming from long distances.

↓ ↓

Uncertainty in Canada

Toronto

• • • **The advance** of $5 per ton in steel prices announced by Algoma



WATCH FOR BALANCE IN HOISTS

LO-HED, the *Balanced* Hoist. You can identify a Lo-Hed Hoist a "mile away". Many have said just that. And it's true. A Lo-Hed Hoist looks distinctly different from any other hoist—because it is different. The difference begins with the arrangement of the motor and drum. See how they are arranged around the beam! This unusual construction permits the use of efficient spur gearing, easily removable covers. You also get minimum headroom, a valuable plus advantage if hoists are to be used now or later under low headroom conditions. Write for Lo-Hed catalog today.

LOOK AT THE BALANCED LO-HED!

It Costs Less To Operate — All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

It Costs Less To Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.

It's Safe—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

The Lo-Hed Hoist Is Applicable To Any Monorail System. There's a Balanced Lo-Hed Electric Hoist For Every Purpose

OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative.

AMERICAN ENGINEERING CO.
2410 Aramingo Avenue, Philadelphia.
☐ Please send me your complete catalog of LO-HED HOISTS.
☐ Ask your representative to get in touch with me promptly.

Name .....
Company .....
Street Address .....
City ..... State .....
(Please print plainly)

Steel Corp., Ltd., has created an uncertain situation in Canadian steel markets. Since the original announcement, Dominion Steel & Coal Co., Ltd., has issued notice of similar advances, but so far the Steel Co. of Canada, Ltd., has not fallen in line. Officials of the latter company state they have made no change in prices. However, the Steel Company is more persistent in its policy whereby prices are made known only at time of shipment. Backlogs on the books of Canadian steel producers all have been accepted on price at time of shipment basis. Thus consumers are protected only with regard to supply and not price. Deliveries also are uncertain as most shipments of steel are under instructions of the Steel Controller. It is reported that the price advance has been confirmed in government circles by Order-in-Council, approved by the Steel Controller and the Wartime Prices and Trades Board.

Since the price advance was first announced a week ago, there has been considerable discussion among steel interests as to whether the advance can be passed along to the final purchaser of the finished product. This question has not been settled and no pronouncement has been forthcoming from government sources. The government itself is the principal buyer of finished products. A large number of Canadian manufacturers have government contracts on hand obtained by tender when specific prices were quoted. These prices were based on steel at the lower price.

The
UDYLITE-MALLORY
Rectoplater
FOR ECONOMICAL PLATING AND ANODIZING AMPERES
(IMMEDIATE SHIPMENT!)

Adaptable to Any Plating or Anodizing Process! Produces 1440 amperes at 6 volts or 720 amperes at 12 volts. By grouping in series or parallel, any combinations of current and voltage can be secured.

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Convertible! Should your finishing specifications be changed, Rectoplater groups can be rearranged to meet the revised voltage and current specifications.

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Economical! You will receive a pleasant surprise when you learn the price of the Udylite-Mallory Rectoplater.

Dependable! Built for long, trouble-free service, the Rectoplater is a compact, sturdy source of DC amperes. Has only one moving part. Designed to deliver its rated output continuously. The performance of hundreds of Rectoplaters in many leading industrial plants demonstrates their dependability.

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The Machine You Want! If you are considering plant expansion, you should investigate the Udylite-Mallory Rectoplater. Delivery, price, convertibility—these add up to the best bargain in DC power on the market!

Available Now! Delivery from stock the same day the order is received.

THE UDYLITE CORPORATION
1651 E. Grand Blvd., Detroit, Mich.
New York 60 E. 42nd Street | Chicago 1943 Walnut Street | Cleveland 4408 Carnegie Ave.

"Inflationary" Boosts Hit

• • • **Asserting in a** telegram that "inflationary and unfair" price increases have affected domestic mechanical refrigerators since Feb. 14, date upon which WPB froze existing stocks, OPA has asked that prices be restored immediately to Feb. 2 levels. The request March 7 was directed to distributors, dealers and retail outlets.

Aviation Fuel Exempted

• • • **Aviation fuel** and components necessary for its production are exempted from terms of Price Schedule 88 (petroleum). Aviation fuel of 91-octane rating or higher is affected under terms of amendment No. 1, issued March 7.

Change in Cast Pipe Pricing

• • • **Permission for** warehouse operators handling cast iron soil pipe and fittings to compute delivery charges from warehouses in accordance with methods employed on Oct. 1, 1941, is granted in Amendment No. 1 to Price Schedule 100 (cast iron soil pipe and fittings). The amendment is effective March 7. In arriving at a delivered price for shipments originating at a foundry, transportation charges are to be computed at the carload rate, rather than at the total carload

charge. Manufacturers, jobbers and wholesalers who sell pipe other than for shipment from a foundry, are required to file with OPA a notarized document stating that no free zone was recognized by the seller Oct. 1, 1941, or describing the zone or zones on that date.

Hits at "Phantom Freight"

• • • **Violations of** the lead scrap price schedule and other non-ferrous scrap orders through the subterfuge of "phantom freight" were denounced March 3 by Administrator Henderson.

"Price Schedule No. 70 provides that the delivery charge, when delivery is made in the seller's conveyance, may not exceed the lowest available commercial transportation rate on an identical shipment," he said. "This provision is perfectly clear. It leaves no scope for conflicting interpretations or bargaining.

"**For example,** delivery is made in the seller's motor truck. The lowest available commercial charge for a truck shipment between the two points covered by the seller's truck is $2 per ton. It is a direct violation of the schedule to charge or to pay, as part of the delivered price of the scrap lead, $2.50 per ton."

Acts on Plumbing Fixtures

• • • **Following** industry meetings with manufacturers, wholesalers and jobbers of plumbing fixtures and cast iron boilers and radiators, the OPA is conducting an investigation to determine what price ceilings shall be established to cover these products.

Questionnaires are being sent for cost information. Upon the receipt of replies, OPA will decide, probably within 30 days, what the price ceilings for these commodities are to be.

OPA Revises Its Executive Personnel

Washington

• • • **Donald Wallace,** previously assistant director of the price division, has been made assistant administrator of OPA's industrial materials and equipment division, which has been set up as one of four separate divisions in a breakdown of the price division. This change was made in the course of a realignment of executive personnel of OPA to meet the expanded responsibilities arising out of the new Emergency Price Control Act and the rationing authority vested in OPA by the WPB.

The industrial and equipment division has jurisdiction over prices of iron and steel, copper and brass, zinc and lead, industrial machinery, lumber and chemicals.

Herbert Taggart was made assistant administrator and chief accountant of the general products division, which covers consumer durables, rubber, paper and pulp, autos and parts and building materials.

John E. Hamm, deputy administrator, has been made senior

Already figured and charted for you in this catalog are the maximum hydraulic cylinder stroke lengths that can be used with the standard diameter piston rods. If this stroke length does not accommodate the job to be done, an alternate choice piston rod is given with the maximum stroke that can be used for that diameter piston rod.

Along with information of equal importance to the user of hydraulic cylinders, this chart is shown in our Catalog H-40. Your copy will be sent promptly on receipt of your request.

THE TOMKINS-JOHNSON CO.

628 NORTH MECHANIC STREET · · · JACKSON, MICHIGAN

deputy administrator and will continue to be second in command to Price Administrator Henderson.

J. K. Galbraith, formerly assistant administrator, has been named staff deputy administrator, and John S. Keir has been appointed acting administrative deputy administrator.

For the time being, Hamm will handle the organization of the new rationing division, with the assistance of Harold Rowe, who will have executive responsibility for food rationing, and Paul M. O'Leary, who will direct planning and analysis. Both Rowe and O'Leary have been assistant directors of the price division.

Galbraith, as staff deputy administrator, will assist Henderson on policy matters relating to labor, shipping, transportation, taxation, and other policy matters not specifically assigned to OPA organizational units. He also will represent the price administrator in contacts with other agencies, such as WPB. He will review, on behalf of the administrator, all policy statements to the public and work of consultants not specifically attached to OPA operating units. In addition, Galbraith will organize and direct the work of the research section, the transportation section and the questionnaire and financial reporting unit.

C. A. Bishop, who has been special assistant to the administrator, has been appointed official secretary of the OPA. R. K. Thompson has been named executive assistant to the administrator.

Not 1 but 2 WORLD'S LARGEST!

We design and manufacture magnetic pulleys in all sizes, large and small, as part of our daily production.

These two happen to be interesting, not only for their tremendous proportions, 48" diameter by 64" length, but also from the fact they go into one of the country's largest copper mining and reduction plants.

You'll find Stearns Magnetic air-cooled (for more power) pulleys in outstanding mining and manufacturing operations everywhere, fitting proof of a better engineered product, a most for the dollar piece of magnetic equipment.

Should you have a problem involving the use of magnetic pulleys, write for Bulletin 302. No obligations. Get the facts.

Stearns

SEPARATORS DRUMS ROLLS
CLUTCHES BRAKES
SPECIAL MAGNETS

MAGNETIC MFG. CO.

635 S. 28th St. Milwaukee, Wis.

Magnesite Order Amended

• • • **An exception** to the maximum price has been made in Price Schedule No. 75 (dead-burned grain magnesite) permitting Westvaco Chlorine Products Corp. to sell at $32 per ton f.o.b. Chewelah, Wash., from stocks at Permanente, Calif., to its regular customers in that state. Additions for delivered prices and sales in bags or sacks are the same as those set for other domestic sales. A similar exception was made previously for sales by this company from its plant in Patterson, Calif.

The maximum price for other domestic shipments of maintenance grades in bulk remains at $22 per ton, f.o.b. Chewelah. A delivered price in excess of the maximum f.o.b. Chewelah price may be charged, of course. Amendment No. 1, issued March 5, permits sellers to add to maximum prices an additional charge when deliveries are made from stock accumulations other than at the point of production; and allows an additional charge to cover incurred costs for packing for export. The maximum f.a.s. price for export shipments of maintenance grades is the maximum price for delivery to dock, plus $7.50 per net ton when packed in double jute sacks, or $12.50 per ton when packed in wooden barrels. Export sales on c.i.f. or c. & f. basis are permitted at prices to yield the seller the same realization as permitted on a f.a.s basis.

U. S. Steel Corp. Takes $1 Billion Insurance

• • • The various subsidiary companies of United States Steel Corp., other than railroads and steamship companies, have insured their properties with the Factory Insurance Associations, a group of the largest fire insurance companies. In addition to fire and windstorm coverages on plant properties, they have insured against sabotage and damage done by persons of malicious intent. The amount of insurance is approximately one billion dollars.

Romney New A.M.A. Manager; Johnson on Safety Job

Detroit

• • • A general reshaping of activities in the automotive industry is indicated in a shifting of top personnel in the industry's trade associations announced here last week.

The appointment of George Romney as general manager of the Automobile Manufacturers Association, succeeding Pyke Johnson, who has resigned to become president of the Automotive Safety Foundation, was announced here Friday by Alvan Macauley, president of A.M.A. Romney has been Detroit manager of A.M.A. for several years, and was appointed managing director of the Automotive Council for War Production in January.

"Under the new setup, the war program of the industry will be lodged in the Automotive Council for War Production at Detroit," Macauley stated. "The structure of the Automobile Manufacturers Association will be continued intact, thus permitting re-entry of the manufacturers promptly into any field when conditions permit. Until organization of the new council program can be completed in detail, the several divisions of the A.M.A. will continue to function as before."

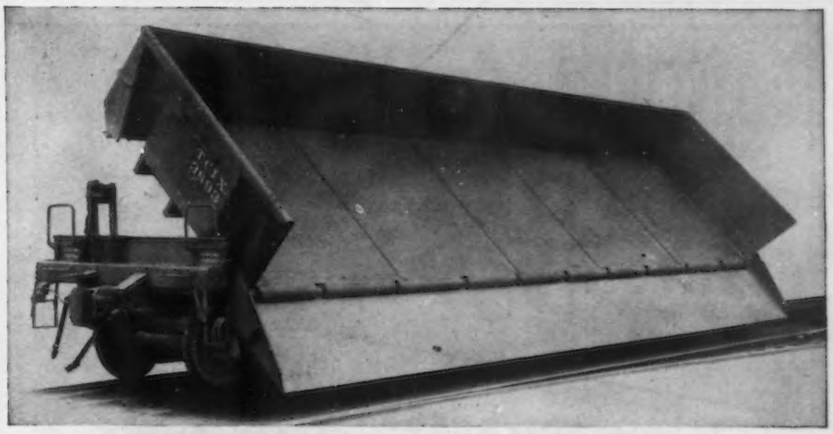
Johnson, for many years vice-president of the A.M.A., has been its general manager since 1939. In his new post he will be primarily concerned with highway transportation in the war period and afterward.

An interpretation of these moves in Detroit is that, while the main body of the industry concentrates on war production only, the safety foundation group will be concerned with problems of car and truck use that are expected to become critical when vehicle and tire shortages, possibly fuel shortages also, begin to interfere with the nation's war effort and the operations of its economic structure.

Use Normal Channels, Rail Shippers Are Told

Washington

• • • Shippers using the railroads were advised last Friday to use normal channels in routing carload traffic, in order to avoid overburdening the most direct routes.



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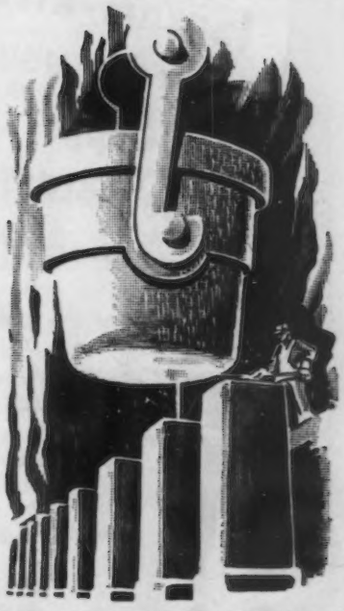
THE INTERESTING
COST FIGURES
ON THESE
INDUSTRIAL
WASTE DISPOSAL
CARS
INCREASED EFFICIENCY 60%



Increased waste disposal efficiency 60%; reduced initial cost 27% . . . these are the savings proved by the Koppel 50 Yd. Automatic Air Dump Car which has now out-moded the 30 yd. types. More than 75 other types of Koppel Industrial Cars provide top efficiency for every haulage problem. Let us show you the actual cost figures which prove that the "Koppel way" is the saving way.

KOPPEL

PRESSED STEEL CAR COMPANY, INC.
(KOPPEL DIVISION)
PITTSBURGH, PENNSYLVANIA

Ship Program Can't Fail, Nelson Says

Washington

• • • **Difference of opinion** within WPB over the progress of the war shipbuilding program was sharply brought out when Chairman Donald M. Nelson last Saturday took issue with Production Director W. H. Harrison who on the previous day at a press conference expressed concern that the President's "blueprint" for a victory goal of 8,000,000 tons of shipping might not be realized because of a shortage of material. Mr. Nelson retorted that he did not recognize any possibility that the program would fall short but on the contrary said that efforts are being made to increase the program.

Rounding out this difference between top officials of the board is the contention that the government itself is to blame for what Mr. Harrison said was the lag in February and March shipbuilding which he attributed to delay in deliveries of plates last October and November. One great difficulty, it is claimed, is that rolling schedules have been interrupted with a consequent delay in plate shipments because of rows over allocations for the three largest consuming sources, the Navy, the Maritime Commission and the railroads.

Since WPB's predecessor, SPAB, had charge of allocations just as WPB now performs that function, the point is made that it should be held responsible for the interruptions. While heavily concentrated demands, it is conceded, may have choked plate capacity and resulted in slowed deliveries, it maintained that uncertainty over rolling schedules, flowing back to disputes over allocations, played an important part in holding up shipments. Each of the three large consuming sources quite naturally sought the needs it contended it should have, and if there were inequities of distribution the fault lay with SPAB rather than with the mills.

Moreover, it is said that difficulty was experienced in getting the Maritime Commission to accept the narrower plate widths rolled on converted continuous mills. The changed specifications were ordered so as to increase capacity and reserve sheared plate capacity for direct defense needs. Whether or not this caused a delay in merchant shipbuilding it is pointed out that it may be a contributing factor. That Navy shipbuilding has not been held is shown by the fact that this program is progressing ahead of schedule.

Mr. Harrison, who is vice president of the American Telephone & Telegraph Co., said that shortages of both steel and aluminum have cut production in both ships and airplanes. At the same time he said that the President's program might be attained and even surpassed if output is speeded up.

The output of about one ship a day in February was "somewhat disappointing," Mr. Harrison said, but not more than 10 ships behind in February. Roughly 10 mer-

OUTWEARS ANY ORGANIC FINISH 10 to 1

Ingram-Richardson Porcelain may be your logical substitute for Copper, Aluminum, Stainless Steel, Brass, Galvanized Steel...

● For many manufacturers, non-corrosive metals listed above are OUT. Substitute materials must be located. Have you considered Porcelain Enamel? This inorganic finish, fused into the very pores of either steel or cast iron at high temperatures, gives an extremely hard, smooth, easy-to-clean surface. Outwears any organic finish 10 to 1. Acid resisting finish available if needed. One coat enameling produces rust-resisting surface at low cost. Two large INGRICH job enamel plants equipped to give prompt service on wide range of industrial and consumer products. Our engineers are at your service. Write us.

INGRAM-RICHARDSON MFG. CO., Beaver Falls, Pa.
INGRAM-RICHARDSON MFG. CO. of Indiana, Inc., Frankfort, Ind.

INGRAM-RICHARDSON
Porcelain Enamel

chant ships of 10,000 tons each such as are covered in the 1942 program require about 28,000 tons of plates.

Most of the disappointment, Mr. Harrison pointed out, was due to shortage of materials, but he added that steps have been taken to eliminate the supply bottlenecks.

In his comment that he did not recognize the possibility of achieving the shipbuilding program but instead WPB was trying to increase it, Mr. Nelson said that the program "has got to come through. The whole nation is at stake."

↓ ↓

28 Deliveries, 28 Launchings And 56 Keels Laid in February

Washington

• • • **In a radio report** on the operations of the U. S. Maritime Commission on Monday evening, March 10, Rear Admiral Howard L. Vickery reported that during February 28 ships, or one a day, were completely outfitted and delivered for service. In addition, 28 ships were launched, and the keels for 56 more were laid.

The ship program, according to Rear Admiral Vickery, calls for 2877 ships, 157 of which were delivered by March 1. Commenting on the speed of ship construction, he stated that while seven months was the best record for the construction of a ship during the World War I, made at Hogg Island, the Liberty cargo ships are being delivered in 105 days; 60 days on the ways and 45 days being outfitted. By midsummer two ships a day will be delivered for service.

During the first 10 months of 1941, Vickery stated that a total of 5,000,000 man-hr. of labor was lost in shipyards and repair yards because of strikes, equal to the labor required for the construction of 10 Liberty ships, but this year strikes have been very low compared to the man-hr. worked.

↓ ↓

Sun Shipbuilding Co. Starts Construction of 8 New Ways

Philadelphia

• • • **An A-1-a priority** rating was assigned to the Sun Shipbuilding Co. to obtain materials for the eight new shipways that will be built in Pennsylvania. Belmont Construction Co. has the building contract and Bethlehem Steel Co. is supplying the shapes, H beams, and some of the other material.

The new ways, expected to be completed July 1, are part of the shipbuilding expansion program. While it has not been officially announced, it is believed a new type materials transport ship will be built here. Details on the boats are expected forthcoming from the United States Maritime Commission shortly.

A program of construction of 96 oil tankers is now underway at Sun, and the ships are expected to be completed this year.

Specify
R-S FURNACES
A PLEDGE AND A PROMISE
Designers and manufacturers of a diversified line of heat-treating furnaces since 1908, R-S pledges full support of the all-out production effort so that Democracy and our free way of life may survive. Now is the time when specialized experience and speed can best serve the common goal of supremacy over aggression.
Steel and other metals for the implements of war must be heat-treated. R-S Engineers are specialists in the manufacture of heat-treating furnaces — furnaces that are designed for every heat-treating operation and for uniform, peak production. Previously arranged plans permit of surprisingly fast deliveries.
For the speedy solution of emergency heat-treating problems, R-S promises full cooperation for the duration.
Call on experienced R-S Engineers.
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Philadelphia, Pa.
R-S FURNACES OF DISTINCTION

Few Details Given On 13 New Projects

Washington

• • • **In line with** its censorship rules, the War Department on Tuesday announced thirteen construction awards and authorizations without giving details about the projects. In each instance, it was stated that the cost would be in excess of $5,000,000.

One award was made to the Ohio Steel Foundry Co., Lima, Ohio, for consultant services, personnel training and operation of a manufacturing plant. Other awards are:

H. B. Deal & Co., Inc., St. Louis, construction of manufacturing plant in Arkansas.

Atlas Powder Co., Wilmington, Del., consultant services, procurement of equipment, personnel training and operation of manufacturing plant.

Hercules Powder Co., Wilmington, Del., for design, construction, equipment and operation of additional facilities at two manufacturing plants.

Smith, Hinchman & Grylls, Inc., Detroit, and Toltz, King & Day, Inc., St. Paul, for architect-engineer services for additional facilities at a manufacturing plant in Minnesota.

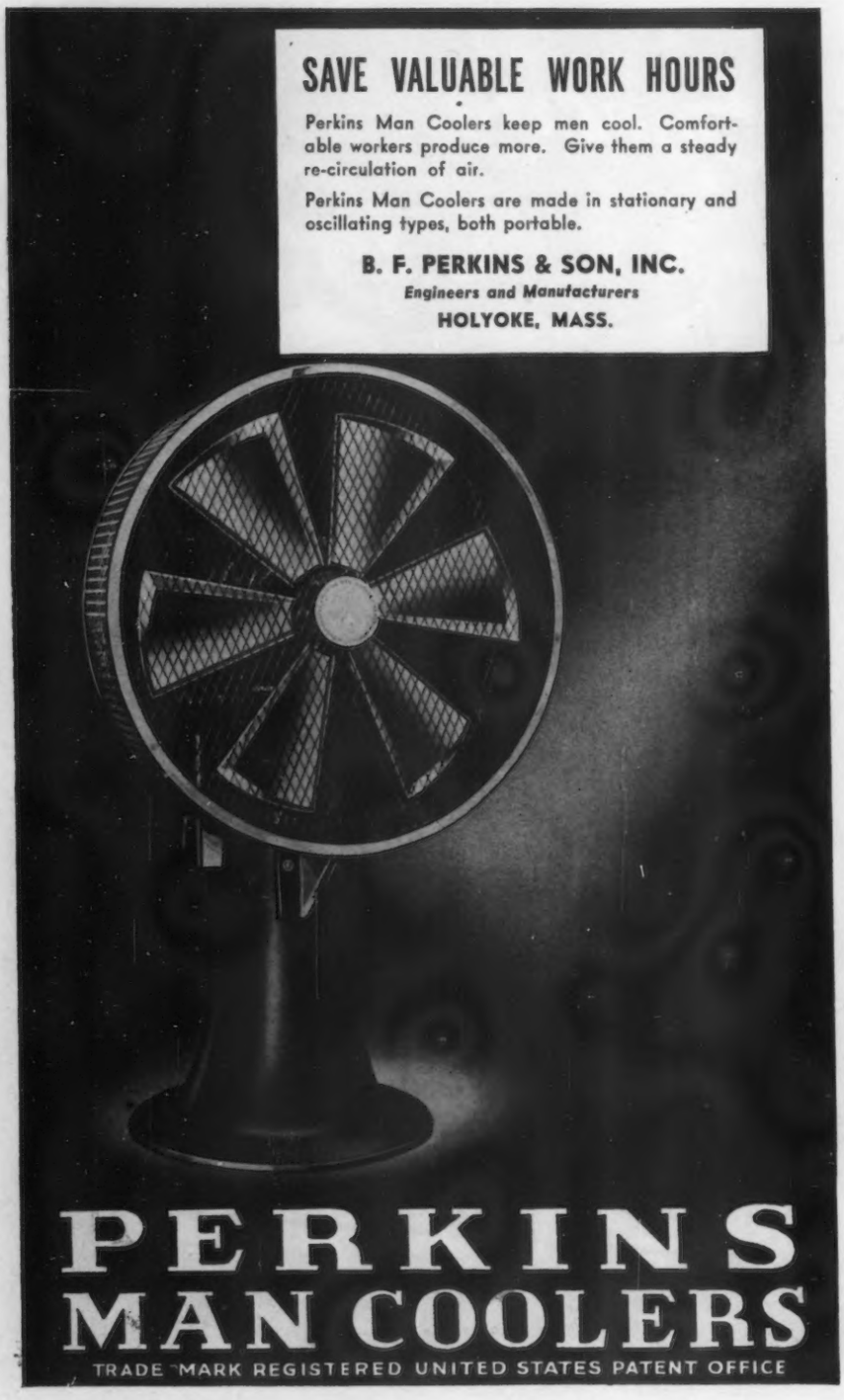
Quaker Oats Corp., Chicago, for consultant services, procurement of equipment, training of personnel and operation of a manufacturing plant.

Modjeski & Masters, Harrisburg, Pa., for architect-engineer services in connection with construction of general depot in Pennsylvania.

Arthur Johnson & Necaro Co., Long Island, N. Y., similar contract for depot in Pennsylvania.

Doyle & Russell and Wise Contracting Co., Richmond, Va., similar contract for depot in Virginia.

Authorizations announced were: Manufacturing plant in Pennsylvania; addition to manufacturing plant in Oklahoma; manufacturing plant in Texas; expansion of manufacturing plant in Ohio. Construction of these plants will be supervised by the War Department Engineer Corps.


SAVE VALUABLE WORK HOURS
Perkins Man Coolers keep men cool. Comfortable workers produce more. Give them a steady re-circulation of air.
Perkins Man Coolers are made in stationary and oscillating types, both portable.
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MAN COOLERS
TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

More Awards Made for Cargo Vessels and Shipyards

Washington

• • • **The Maritime** Commission last week announced the award of contracts covering 163 additional cargo ships, the construction of a 10-way shipyard at Swan Island, near Portland, Ore., for the Kaiser Co., Inc., under existing management; a six-way yard at Jacksonville, Fla., for the St. John's River Shipbuilding Co., and the addition of three ways to Permanente shipyard at Richmond, Cal. These contracts make a total of 922 merchant ships ordered by the Commission since Jan. 6.

The new contracts provide for construction of 148 additional emergency cargo vessels, known as Liberty ships, and 15 C-4 type cargo ships of standard Commission design.

The new shipbuilding contracts are:

Kaiser Co., Inc., Vancouver, Wash., 24 Liberty type; St. John's River Shipbuilding Co., Jacksonville, Fla., 30 Liberty type; Permanente Metals Corp., Richmond, Cal., 24 Liberty type; Kaiser Co., Inc., Swan Island, Ore., 70 Liberty type; Kaiser Co., Inc., Richmond, Cal., 15 C-4 type.

The 19 new shipways to be constructed under the contracts awarded make a total of 169 ways which have been authorized by the Maritime Commission since the inception of the emergency ship construction program about a year ago.

Korndorff Refutes CIO Charges

• • • **Replying to a** statement of Irving Abramson of the CIO charging that there is a 51 per cent lag in the war output of Northern New Jersey industries, L. H. Korndorff, president of the Federal Shipbuilding & Dry Dock Co., United States Steel subsidiary at Kearny, N. J., said March 10 that his company is employing as many men and is working as many hours per week as the receipt of materials, machinery and equipment for its operations will permit.

"All work in hand is on or ahead of schedule and the company is building ships in record time," he said. "An instance of this was the recent delivery of a destroyer, five months ahead of the contract delivery time. . . . The bottleneck, so far as this company is concerned, is in the manufacture and supply of certain auxiliary equipment by outside companies."

Progress Report April 1 Called for by Nelson

Washington

• • • **With the idea** of achieving his goal of a 25 per cent increase in defense, WPB Chairman Donald M. Nelson has called on management and labor representatives of major plants having war contracts to report by April 1 on their progress in organizing labor-management committees for the "all out production drive."

Despite its close resemblance, or exact likeness to it, Mr. Nelson has denied charges that this is the CIO plan so vehemently ballyhooed by Phil Murray, CIO head, and Walter P. Reuther, president of CIO's UAW.

The day following the call for the labor-management reports, Mr. Nelson discussed labor problems with Murray and AFL President William Green. Mr. Nelson said Murray and Green pledged their "whole hearted support" of his program for a 25 per cent output increase with existing facilities.

Crawford in Liaison Post

• • • **Clay C. Crawford,** New York, has been appointed assistant to the chief of the bureau of priorities to handle liaison between the bureau and the priorities committee of the Army and Navy Munitions Board.

Berna Sees War Output Overwhelming the Axis

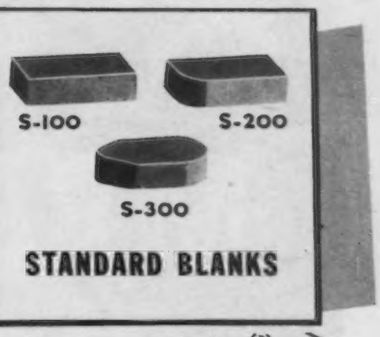
Cleveland

• • • **The expanded** machining capacity of the nation's war production factories is a definite promise of defeat to the enemy, Tell Berna, general manager of the National Machine Tool Builders' Association, told members of the Cleveland Engineering Society at a dinner meeting March 10.

"New machine tools built and installed since the war began," Mr. Berna said, "have already practically doubled the nation's productivity. From our knowledge of where these machines are and the work they are doing, I can say to you with assurance that right now, today, war production is rolling—rolling with a momentum that will overwhelm the Axis."

Mr. Berna said machine tool output, already over five times normal, is steadily mounting.

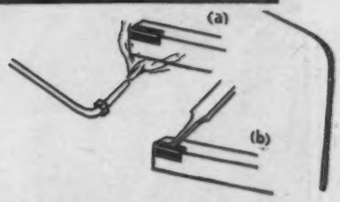
Save TIME BETWEEN ORDERING AND "TOOL UP"



STANDARD BLANKS

By making your own KENNAMETAL TOOLS

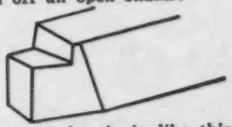
• KENNAMETAL tool blanks are shipped in 2 to 5 days after receipt of your order. That means you can have the advantages of KENNAMETAL quickly if you order these blanks and braze your own tools.



Two steps in brazing KENNAMETAL Tools. (a) Heating shank with torch. (b) Pressing tip into place with file.

It's easy to make KENNAMETAL TOOLS *in your shop*
If You Follow Simple Instructions in our Vest Pocket Manual

It isn't always necessary even to mill a pocket for the KENNAMETAL tip. Contrary to popular impression the side wall on the reverse of a tipped tool is unnecessary, and eliminating it avoids brazing strain caused by warping. In such cases simply shape or grind off an open shank:



and braze the tip in like this:

NOTE: It is possible to save time and steel as well by re-tipping your old tools. Just saw off the shanks and braze on new KENNAMETAL TIPS.

• You need only standard tool room equipment, plus a torch or a brazing furnace, to make your own KENNAMETAL steel cutting carbide tools. First step is to mill a pocket in the steel shank or simply shape or grind a step as shown at left. Then, using Tobin bronze or Ezy Flo, braze in the KENNAMETAL tip, and after it has "set," grind the clearance angles. Complete, easy to follow instructions are included in KENNAMETAL Catalog 42, or write for our new vest pocket manual for KENNAMETAL users.

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FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO. (Exclusive of Canada, Great Britain and Possessions)

KENNAMETAL
The Accepted STEEL CUTTING CARBIDE

Plants Asked to List Idle Machines with WPB

Washington

• • • **Approximately 50,000 pieces** of equipment may be made available for sale to war materiel producers if owners of idle machines cooperate fully in listing their tools with WPB's Available Used Tools Section it was estimated by George C. Brainard, chief of the Tools Branch, in a request made last week asking such owners to make their machine tools available for sale so that they can be placed in plants engaged in war production. Once the tools are listed the information will be incorporated in WPB reference files for operators of war production plants. Mr. Brainard said that recent recording of tools in the possession of used machine tool dealers resulted in the listing of approximately 40,000 idle machines. Many of these have found their way into war production, it was stated, and every effort is being made to keep the list up-to-date by adding more tools to it.

Mr. Brainard asked shop foremen to search their plants for "forgotten" machinery. He also urged that plant operators having several machine tools of the same type consider the possibility of doing the work on fewer pieces of equipment and releasing the others for war work. "Many of the machines needed in war production are for single purpose operations and almost any piece of equipment will find a spot where it can be used to advantage," Mr. Brainard continued. "If it is in poor condition, it can be rebuilt either by the purchaser or any competent rebuilder of machine tools.

"Those in charge of listing these tools should be instructed to locate as many parts belonging to these tools as possible. Loose parts are often stored carelessly. They may mean little or nothing to the owner when he disposes of the idle machine, but they are a real help to the ultimate user, especially now when it is almost as difficult to obtain parts as it is to get new equipment.

"Everyone who finds he has idle tools available for sale is asked to write the Available Used Tools Branch of the War Production Board, Social Security Building, Washington. To make the records uniform, sheets 8½ x 11-in. should be used, listing one machine on each sheet. A copy of each listing should be retained until such machine is sold, then the owner's copy should be forwarded to the WPB.

"In listing available machines for sale give make, type, size and description, including age and serial number. State whether the drive is cone or geared head, and give the machine's condition (excellent, good, fair or broken). Any extra or missing parts should be noted. The present location of the tool should be listed with the name of the owner, the asking price, and name and telephone number of the person to contact for purchase. A photograph or cut of the machine will be very helpful. Do your part by sending in this information *now*," Mr. Brainard pleaded.

Tool Engineers to Discuss War Problems at St. Louis

• • • **Plans for accelerating** and mobilizing the nation's war production and at the same time conserving the supply of vital material and tools will be discussed at a series of technical sessions at the 10th annual convention of the American Society of Tool Engineers in St. Louis on March 26, 27 and 28. Representatives of the 52 Chapters of the national technical society, whose membership is now at an all-time peak of more than 10,000 will meet at the Hotel Jefferson for the sessions.

Conversion from peace to war production will be the topic of the open session on Thursday, March 26, at 2:30 p. m., with Clifford Ives, state director, Contract Distribution branch, WPB, Milwaukee, presenting the government aspect of the problem, and Hugh H. C. Weed, vice-president of Carter Carbureter Corp., St. Louis, giving the industrial viewpoint.

That evening there will be a session devoted to the discussion of substitutions and shortages of materials. Arthur Stockstrom, president, American Stove Co., will speak on general problems of non-defense industries. Dr. D. R. Kellog, Westinghouse Electric & Mfg. Co., will cover engineering, manufacturing and metallurgical problems in volved in materials substitution. This will be followed on Friday morning, March 27, by a session on cutting tool conservation headed by A. H. d'Arcambal, vice-president, sales manager and consulting metallurgist of Pratt & Whitney Division, Niles-Bement-Pond Co., who will speak on "Cutting Tool Designs" and "Getting the Greatest Service Out of Cutting Tools," and by L. W. Lang, sales manager of the National Tool Salvage Co., who will discuss the salvaging of worn-out cutting tools usually thrown on the scrap heap. Prof. O. W. Boston of the University of Michigan, will round out this important session with a talk on "Tool Life and Cutting Fluids."

Col. R. E. Hardy, of the St. Louis Ordnance District, will cover government problems under the topic "Problems Relating to Defense Inspection" at a session scheduled for Friday afternoon. F. E. Allison, chief inspector, Wagner Electric Corp., will speak on industries' problems at this session. The annual dinner will be held Friday evening, with Frank W. Curtis, president of the society, as chairman.

An important feasure of this three-day meeting is plant tours. A.S.T.E. members will visit plants throughout St. Louis and get a slant on production in that section. Names of the plants cannot be disclosed due to government restrictions.

The meeting will come to a close Saturday morning with a session devoted to aircraft mass production at which H. E. Linsley of the Wright Aeronautical Corp. will speak on manufacture of aircraft engines, and Col. Kenneth B. Wolfe of the production engineering section, materiel division, U. S. Army Air Corps, Wright Field, Dayton, Ohio, will talk on problems of the service influencing design.

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Operation is mechanical and cam actuated. Makes and breaks contacts clean as a whistle. No injurious arcing — no time out for repairs. Provides 3 running speeds either forward or reverse in Mercury Lift Trucks, 4 speeds in Mercury Fork Trucks.

And it's safe—Control handle must be returned to neutral before starting. Travel speed is electrically interlocked with brake pedal. A magnetic contactor is used to open main power circuit when the operator leaves his seat.

For the complete story on Mercury Snap Action Cam Operated Controller and the full line of Mercury Material Handling Equipment write for Bulletin 201-5

Mercury Pioneered and Perfected These Lift Truck Improvements:

The Hydraulic Lift
Snap Action Cam Operated Controller
Single Unit Double Reduction Drive Axle
All Welded Frame
Special Trail Axle Design

MERCURY TRACTORS TRAILERS LIFT TRUCKS

MANUFACTURING CO. 4144 S. Halsted St., Chicago, Ill.

Adams Warns Steel Must Be Rolled in Proper Sequence

Washington

• • • **WPB Iron and Steel Branch** Chief E. C. Adams on Monday told the presidents of steel companies that war orders for steel must be produced in proper sequence of preference ratings, regardless of what the product involved. He quoted paragraphs B-4 and B-10 of General Preference Order M-21.

His letter, by way of illustration, said that a sheet or pipe order bearing a lower rating must not be produced before a higher rated bar or plate order requiring the same delivery unless the bar and plate mills in question are operating at the greatest possible capacity.

"To accomplish this in the interest of the war effort," said Mr. Adams, "it is necessary to apply the preference rating system, beginning with the ingot production of each producer and see that it is followed strictly in all subsequent operations, in the absence of contrary instructions from the director of industry operations. In other words, your finishing mills carrying high preference ratings must be provided with steel to insure maximum operations regardless of the fact that you may not then be able to assign steel for the production of lower rated products."

Two low pressure meters installed in coke oven plant. Roots-Connersville Meters are suitable for all gases.

- **Prover-tested** at factory. The accuracy of Roots-Connersville Meters is constant, because the measuring chambers are bounded by accurately machined heavy cast iron surfaces.
- **No adjustments required.** Non-tamperable. Accuracy is built in, and maintained over range of 5% to 150% of normal rating. Displacement is not affected by variations in specific gravity, rate of flow, pulsations, moisture, or impurities.
- **No internal contact,** wear, or lubrication. No water is used, so gas remains as dry as at inlet to meter.
- **Bulletin 40-B13** illustrates and describes many types of meters for a wide range of capacities and pressures. Ask for it.

ROOTS-CONNERSVILLE BLOWER CORP.
203 Ohio Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854 — ALL OUT for VICTORY

GAS METERS
FOR LOW, MEDIUM OR HIGH PRESSURES

Copper Warehouse Stocks

• • • **The proposed assignment** of a preference rating of A-9 for replenishment of stocks by warehouses handling copper and copper products has been revoked by WPB. Paragraphs (f) and (g) of order M-9-a, which would have permitted the warehouses to make use of the rating after February 28, has been deleted, effective February 25.

Textile Machinery Repairs

• • • **Seeking to speed up** war work by the huge textile industry, WPB has raised from A-10 to A-8 the preference rating available for deliveries of materials to producers of spare parts for maintenance and repair of textile machinery and equipment. The A-10 rating for these parts expired March 1, and under an amendment to order P-53 the plan has been extended until June 30, with substitution of an A-8 classification.

New Fire Apparatus Order

• • • **WPB has announced** the issuance of a revised form of order P-45, which assigns an A-2 rating for material entering into the production of motorized fire apparatus to be delivered on defense orders. The new order, issued and effective today, requires a statement on form PD-82 of materials

needed, and restricts use of the rating to authorized quantities. Title of the order has been changed to "Motorized Fire Apparatus" to distinguish it from the new order No. P-108 for "Fire Protective Equipment."

Jewel Bearings

• • • **Further restrictions** on the use of jewel bearings have been announced today by WPB. Order M-50 has been amended to prohibit the use of large ring jewel bearings or vee jewel bearings except on orders with a rating of A-9 or higher. The original order, effective March 1, limited deliveries by suppliers but did not cover usage. Two other changes have been made: Large ring jewel bearings are redefined for size to include smaller ones than originally covered by the order, and an exception is made so that the restrictions of the order do not apply to any jewel bearing which by January 15, 1942, had been physically incorporated in a device where it was subject to friction.

Airlines Rating

• • • **A preference** rating change from A-3 to A-1-j was given to commercial airlines for securing materials, equipment, and maintenance of service by WPB on March 6, by Amendment No. 1 to Order P-47. Air carriers and suppliers applying the higher preference rating must furnish a copy of the amendment to each supplier to whom the original order was furnished. Copies of the new P-47 forms with the A-1-j rating will be available soon, and in the meantime the original P-47 plus the amendment may be used.

Trucks, Trailers, Buses

• • • **Covering a 1942** program, orders were issued last Friday by the WPB raising from A-3 to A-2 the preference rating available for deliveries of materials for replacement parts for medium and heavy trucks, truck trailers and buses. The program does not affect production of parts for the Army and Navy and other designated government and lend-lease operations.

Under amendments to limitation order L-35 and preference rating order P-107, issued and effective March 5, which supersedes the original orders announced Jan. 22, WPB authorized producers and suppliers to apply the A-2 rating to obtain deliveries of materials going into the manufacture of designated spare parts. The orders apply only to medium and heavy trucks, truck trailers, passenger carriers and school bus bodies. Parts for which the new rating may be used are listed in both the limitation order and the preference rating order.

Industrial Lift Trucks

• • • **A two-month** extension until May 10 of order P-40, making

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available an A-1-g rating for materials going into the manufacture of industrial lift trucks and replacement parts has been announced by WPB. Manufacturers of these trucks are expected soon to file material requirements under the Production Requirements Plan, and the extension of the A-1-g rating is designed to enable them to continue to get materials pending the transition to PRP. WPB advised manufacturers that order P-40 will in no event be extended beyond May 10.

Steel Strapping

• • • **Steel strapping** is interpreted by authorities as "operating supplies" and as such carries a rating of A-10 under preference rating order P-100, Acme Steel Co. reports. Because this order forbids the application of the rating to "non-ferrous material to be used as packaging supplies," there has been some misunderstanding to the effect that steel strapping could no longer be obtained, the company said. This is not so, as steel strapping is "ferrous" material and therefore is eligible to receive an A-10 rating on order P-100.

Railroads May Use Copper

• • • **An amendment** to order M-9-c issued by WPB permits the use of copper for essential operating parts and essential maintenance repair parts for railroad locomotives, cars and equipment. The amendment adds railroad uses to list "B" of the order, which permits the use of copper where the use of less scarce material is impractical.

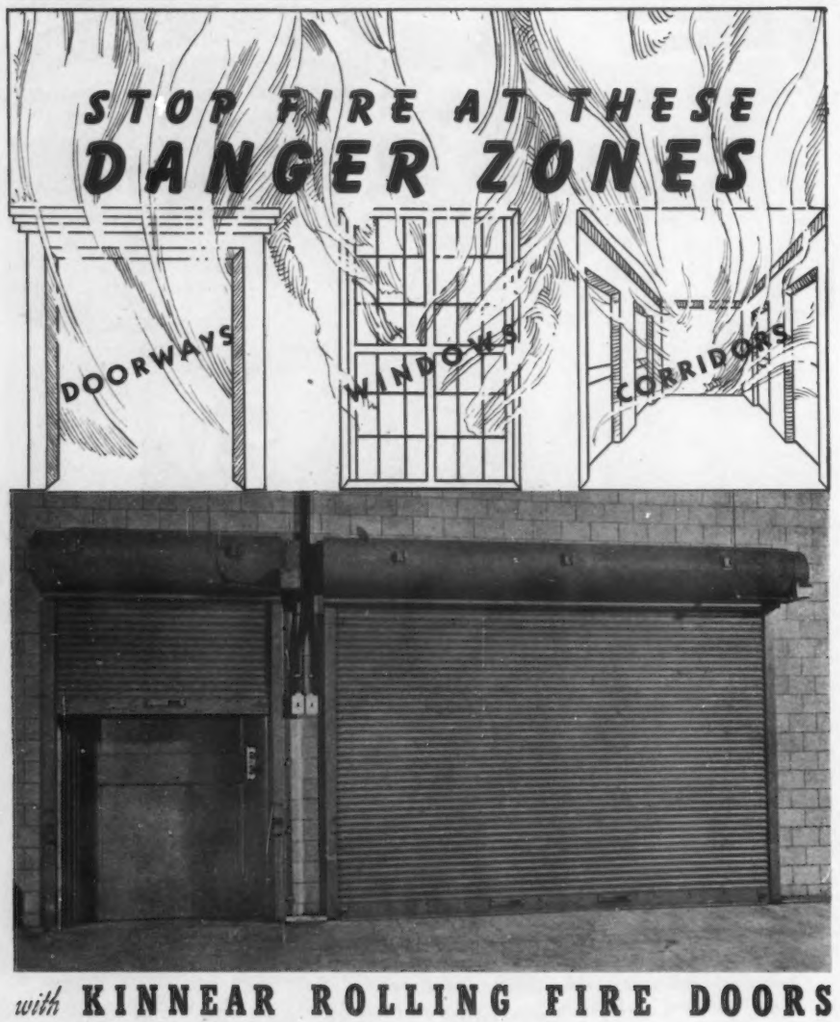
Mine Order Revamped

• • • **An amendment** to priority order P-56, announced last week, provides higher ratings for repair and maintenance of essential mine machinery and lower ratings or complete elimination of ratings for non-essential mining purposes.

At the same time, order P-56-a, which formerly assigned a single rating to material entering into the production of mining machinery and equipment, has been amended to permit the assignment of rating or ratings to a producer based on the pattern of ratings on the orders he is engaged in filling by a procedure similar to the Production Requirements Plan.

The A-3 rating formerly assigned to materials for repair and maintenance of mining machinery has been withdrawn, and an A-1-c rating has been assigned to materials for the repair and maintenance of essential machinery with specified restrictions, subject to a quarterly quota to be established for each mining enterprise by the Director of Industry Operations.

The A-8 rating assigned to materials for maintenance and repair not covered by the A-1-c rating is continued in effect, and an A-10 rating is assigned for materials such as office supplies which are not closely connected with actual production. Suppliers will here-



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after be permitted to extend ratings on orders received from mine operators, and the system of reports required in connection with both P-56 and P-56-a has been simplified.

Tin Can Order Revised

• • • **Provisions of conservation** order M-81, which restrict sizes for primary and secondary cans made of tin plate or terne plate has been modified by WPB to permit manufacturers to deliver this year cans of any size for primary and secondary products which were completely manufactured or whose parts were completely cut on Feb. 11. Canners are also permitted to buy and use such cans as well as cans of sizes other than those specified in the order which were in their possession on that date.

Simultaneously with the issuance of the amendment, groups of canners entitled to file appeals under the provisions of order M-81 were requested to write the Containers Branch for appointments before coming to Washington. It was stated that it is necessary to arrange appointments in advance so there will be adequate time to schedule meetings with the proper departments or divisions. Requests for appointments should be addressed to H. F. Krimendahl, Room 3424, War Production Board, Social Security Building, Washington, D. C.

Chemical Industry

• • • **Operating supplies** to which a preference rating may be applied under the terms of order P-89, covering maintenance, repair and operating supplies for the chemical industry, have been redefined by an amendment to the order, according to WPB. Rating under P-89 may be applied only by firms which are given specific authorization with a serial number. Up to the present time no company has received permission to operate under the terms of the order because applications so far received indicate that the order as originally issued was too broad in its coverage.

As defined in the amended order, operating supplies means any material which is essential to the operation of the producer's plant including, but not limited to, lubricants, fuels, catalysts, and small perishable tools. Specifically excluded are materials physically or chemically incorporated into the producer's products, and material other than catalysts which enters into the chemical reaction necessary to the manufacture of the producer's products. Washes, solvents, extractions, etc., are also excluded.

The order has also been amended to permit its use by Canadian firms when specifically authorized by WPB.

Construction Projects

• • • **Extension of** preference ratings by building contractors will be facilitated by a new form of

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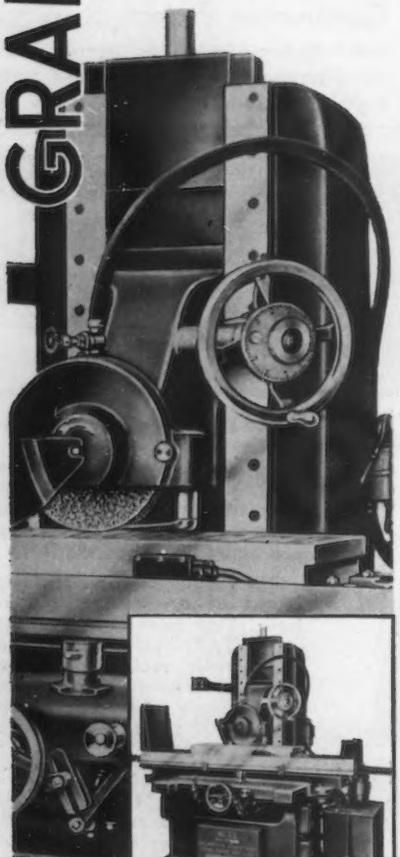

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order, P-19-h, which will be used in most cases hereafter to assign ratings to construction projects in response to applications on forms PD-200 and PD-200A, WPB reports.

The new form of order will permit application of ratings by builders by a simple endorsement on purchase orders, containing the serial number issued for the project. A similar form of endorsement may be used for extension of ratings on orders served on the builders' suppliers, except that before extending a rating a supplier must execute and forward to the War Production Board a special form of acceptance. Only one filing of the acceptance is necessary, after which the supplier may extend any rating assigned by order P-19-h, regardless of serial number.

Suppliers to whom ratings are extended under the new order may accumulate the ratings up to a period of three months until they can place an order for a minimum commercial quantity of the rated material if they do not process it in any way, and, subject to the same restrictions, suppliers may "basket" or accumulate ratings on orders from two or more contractors.

Appeals by Canners

• • • **Groups of canners** entitled to file appeals under the provisions of conservation order M-81 were requested today to write the War Production Board Containers Branch for appointments before coming to Washington. Requests for appointments should be addressed to H. F. Krimendahl, Room 3424, War Production Board, Social Security Building, Washington, D. C.

Truck Trailer Material

Washington

• • • **The A-3 preference** rating available for deliveries of materials going into the manufacture of truck trailers and buses, and medium and heavy motor truck bodies and cabs, due to expire Feb. 28 was extended to April 30 by WPB. The extension, announced last Saturday, does not apply to materials for complete trucks and truck chassis. This action is to assist bus manufacturers to get materials during the time in which they are expected to switch operations to the Production Requirements Plan, this must be done by April 30.

Meanwhile, WPB granted a 60-day extension to May 10 of preference rating order P-40, making available an A-1-g rating for materials going into the manufacture of industrial lift trucks and replacement parts. This extension was similarly designed to enable lift truck makers to come under the Production Requirements Plan, and at the same time use the preference rating.

Refrigerator Repair Order

Washington

• • • **The maintenance of** refrigerating equipment in stores and restaurants was granted a preference rating of A-10 by an amendment to maintenance and repair order P-100 issued March 9 by WPB.

WPB'S Plate, Shape Unit Is Enlarged

Washington

• • • **The staff of four** units of WPB's Iron and Steel Branch has been enlarged by the appointment of six men from the steel industry. Heads of three units and three assistants of the Plate and Shape Unit named were:

Hot Rolled Carbon Bar and Semi-finished — W. F. Vosmer, Cleveland, who has been sales manager of the carbon bar division of the Republic Steel Corp. since 1930.

Distressed Stock — Ralph J. Stayman, Pittsburgh, who has been special representative of the bar and semi-finished material division of the Carnegie-Illinois Steel Corp.

Rail — Orrin H. Baker, Chicago, who has been assistant manager of sales of the railroad materials division of the Carnegie-Illinois Steel Corp.

Plate and Shape — A. L. Meyer, who was with the Great Lakes Steel Corp.; A. S. Hoff, who was with the Inland Steel Co.; and R. A. Marble, who was with the Carnegie-Illinois Steel Corp., Pittsburgh.

Farm Repair Parts

Chicago

• • • **The fact that an** A-3 priority rating is no longer sufficient to get satisfactory shipments of steel has been made plain to America's farmers in a statement by the International Harvester Co. In reply to countless complaints that new farm equipment and repair parts cannot be obtained, the country's largest builder of farm equipment explains that the situation cannot be blamed on the equipment industry nor on the federal government — but entirely on Rome, Tokio and Berlin.

↓ ↓

Metal Working Extension

Washington

• • • **WPB on Monday** extended to June 30, preference rating order P-11-a, assigned to producers of metal working equipment to whom a copy of the order with a serial number has been addressed.

↓ ↓

Steel Plate Ordered

Washington

• • • **WPB on Monday** formally issued order M-21-c, covering the allocation of steel plates. The allocation system was reported in THE IRON AGE of Feb. 19, page 104. The order changes the definition of plates to include stainless steel.

↓ ↓

Order Issued on Turbines

Washington

• • • **On Monday,** WPB issued Order M-76 enabling the Director of Industry Operations to establish production schedules for orders already placed with manufacturers of turbines and to prevent their displacement by a purchase order subsequently placed.

↓ ↓

Welding Machine Extension

Washington

• • • **WPB on Monday extended** to May 1 preference rating order P-39, which assigns a rating of A-1-c to deliveries of material for the production of arc welding and resistance welding machines. It was scheduled to expire on March 15. Companies operating under the terms of the order have been advised of the extension, but at the same time have been warned that the order will not be further extended and advised to apply for priority assistance under the Production Requirements Plan.

↓ ↓

Pinball, Juke Box Makers To Switch to War Work

Washington

• • • **Manufacturers of** pinball machines and "juke boxes" will

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switch to the production of important parts for Army Signal Corps radio sets, under procurement plans announced by the War Department. These recreational devices, it was pointed out, normally consume considerable quantities of copper wire, amplifying tubes and other electrical goods for which priorities have now been assigned to military equipment. The manufacturing facilities, raw materials and inventive talent that went into the highly ornamented pinball games and nickel-operated phonographs will henceforth be converted to the production of communication equipment for the armed forces.

Still other industries will aid the regular $200,000,000 radio industry, which itself is expanding rapidly, in the emergency production of signal equipment. Among them are the makers of cameras, refrigerators, typewriters, headlight bulbs, vacuum cleaners, electric fans, eyeglasses and porcelain products. Each of them has special machinery of particular use for some type of signaling apparatus. Eyeglass manufacturers, for example, have been enlisted to assemble quartz crystals into units for controlling the frequency bands of military radio transmitters.

Radio Industry Ordered To War Production

Washington

• • • **The radio industry** which consumed 70,000 tons of steel in 1941 as well as 2100 tons of aluminum, 10,500 tons of copper, and 280 tons of nickel was ordered by WPB last Saturday to war production of airplane detection equipment and military transmitters and receivers. It is expected that the industry will use twice as much metal in the months to come though the WPB order banned civilian radio production after April 22. The 55-company industry now has $500,000,000 in war orders, and the value of 1941 receivers was just half this amount, or $240,000,000.

Replacement parts may be continued to be made, and radios started on or before the production shutoff date may be completed, under the limited production quotas provided for in the original order. But, the order says that no manufacturer shall use more than $500 worth of material and parts ordered after Feb. 11. This was done, WPB said, to permit the purchase of a limited quantity of incidental items to complete production.

Tractors with Tires Hit by New Ban

Washington

• • • **Production of** farm tractors requiring rubber tires must be stopped after May 1, the WPB ruled Tuesday in a further effort to conserve rubber for vital war requirements. Between now and the closing production date, output of rubber-tire type tractors must be sharply curtailed, according to the new order, supplementary limitation order No. L-26-A.

McKeachie in Charge of War Department Buying

Washington

• • • **It was learned** Tuesday that Douglas McKeachie, formerly director of the WPB Division of Purchases, had been placed in charge of all war procurement in the War Department. Mr. McKeachie has been working in the War Department for the past few weeks but no formal announcement was made by WPB.

Seasonal Industries Permitted to Build Stocks

Washington

• • • **Seasonal industries** such as canning factories are permitted to build up their inventories in anticipation of normal peak requirements by an official interpretation issued Tuesday by WPB.

Blast Furnace at Rusk, Texas, May Resume Soon

• • • **It is reported** that the 150-ton charcoal blast furnace at Rusk, Texas, soon will resume operation after many years of idleness. A new company has been organized, and it is understood that DPC will furnish the funds.

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4615	3145	X4340 (Aircraft)
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3130	6145	4140
3135	6150	4150

For those who wish to take advantage of constant metallurgical improvement and development long before they are incorporated in S.A.E. standards or where close selection of material for analysis, grain size, control and quality is desired, we offer

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"A" 15	"B" 3X	"B" 5	"M" Temper

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This Week's Priorities and Prices

Magnesite price schedule No. 75 revised March 5; permits some sales above present maximums. (OPA-PM2627)

Idle machine tools should be sold to plants engaged in war work, WPB says. (WPB-440)

Tin can order M-81 modified to permit manufacture and sale of cans necessary for packing certain "secondary product" vegetables. (WPB-449. Further modified with respect to material already processed. (WPB-436). Canners urged to write to Container Branch, WPB, for appointments before going to Washington to appeal terms of order M-81. (WPB-437)

Truck, trailer and bus replacement parts assigned rating of A-2, replacing previous rating of A-3, in revisions to order L-35 and P-107. (WPB-450)

Commercial airlines' priority rating raised to A-1-j in amendment to order P-47. (WPB-451)

Typewriter deliveries halted by order L-54. New and used models covered. (WPB-452). OPA given authority to ration typewriters. (WPB-456)

Copper mining plants to go on seven-day week basis to boost output. (WPB-441)

Oil sellers granted extension of deadline for reporting sales to March 25. (OPA-PM2623). Oil industry priority order P-98 extended to March 15. (WPB-418)

Paper shipping sacks covered by price agreements made recently by makers of converted paper products. (OPA-PM2611)

Mercurial compound makers requested to maintain for 60 days prices in effect Feb. 25. (OPA-2613)

Medium truck output banned after completion of February quotas. (WPB-429)

Procurement policies of WPB broadened to aid small plants. (WPB-430)

Vapor and vacuum steam heating specialties subcommittee of plumbing and heating advisory committee formed. (WPB-439). Plumbing fixture prices studied with aim of setting a ceiling. (OPA-PM2610)

Non-ferrous price ceiling violations through use of phantom freight charges denounced. (OPA-PM2609)

Cast iron boiler and radiator prices being studied with aim of establishing ceilings. (OPA-PM2610). Rubber order M-15-b amended to permit limited use in several addition groups of products; use in certain other items further restricted. (WPB-396)

Chemical industry order P-89 amended with respect to definition of "operating supplies." (WPB-405)

Copper warehouse rating of A-9 for replacement of stocks, as granted in order M-9-a revoked on Feb. 25. (WPB-407)

Textile equipment spare parts makers given rating of A-8, in place of previously assigned A-10, in amendment to order P-53. (WPB-409)

Telephone companies restricted with respect to engineering practices and plant improvements in order L-50. (WPB-412)

Mine ratings for repair and maintenance of machinery revised in amendment to order P-56 and P-56a. (WPB-415). Gold and silver mines not to be cut off from priority aid by these changes. (WPB-436)

Defense housing builders given simplified method of extending ratings in amendment to order P-55. (WPB-416). Building contractor's procedure for extending ratings facilited by new order P-19-h. (WPB-426)

Gas mask and other anti-gas device production and sale restricted in order L-57. (WPB-417)

Zinc pool for March boosted to 50 per cent of high grade and special high grade output and 40 per cent for all other grades in order M-11-i. (WPB-420)

Bus manufacturing industry advisory committee formed. (WPB-423)

Railroad use of copper under certain conditions permitted in amendment to order M-9-c. (WPB-395)

Industrial lift truck order P-40 extended two months to May 10. (WPB-461)

Radio production for civilian use to stop April 22, according to order L-44a. (WPB-459)

Truck trailer and bus order P-54 extended to April 30. (WPB-460)

Heating boilers of the low pressure type covered by simplification order L-42, schedule III. Orders elimination of certain accessories. (WPB-465)

Federal court in Chicago upholds WPB's right to inspect books of Chicago Alloy Products Co. (WPB-468)

• • •

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, **WPB:300** *means announcement* **300** *issued by the War Production Board.)*

Revisions for the Iron Age Priorities Guide

• • • Following material should be added to THE IRON AGE Priorities and Allocations Guide published with the issue of Jan. 29.

Under "P Orders," page 4, add:

P-19-h...Construction projects; simplifies extension of ratings (3-4-42). Related forms: Pd-200, PD-200a.

P-45...Motorized fire apparatus; a revision of order; assigns A-2 rating (2-28-42). Related form: PD-82.

P-53...Amendment No. 2 — Repair parts for textile machinery; rating assigned raised to A-8 (2-28-42).

P-55...Amendment—Simplifies extension of preference ratings (3-3-42).

P-56...Amendment—Ratings revised (3-3-42).

P-56a...Amendment—Method of establishing ratings revised (3-3-42).

P-89...Amendment—Redefines maintenance, repair and operating supplies for chemical industry; Canadian firms covered (3-2-42).

P-107...Amendment No. 1; raises ratings assigned to A-2. See also L-35 (3-5-42). Related form: PD-25a.

Under "M Orders," page 8, add:

M-9-a...Revokes rating of A-9 given warehouses for replenishing certain stocks (2-25-42).

M-9-c...Amendment — Railroad locomotives, cars and equipment permitted to use copper under specified conditions (2-28-42).

M-11-i...March zinc pool (2-28-42).

M-15-b...Amendment No. 5—Revises lists of products for which rubber use is prohibited (3-1-42).

M-38-f...March lead pool (2-28-42).

M-50...Amendment No. 1—Establishes additional restrictions on use of jewel bearings (2-28-42).

Under "L Orders," page 7, add:

L-1-a...Amendment No. 4—Orders cessation of production of medium trucks (3-2-42).

L-5-b...Amendment No. 1 — Permits certain government agencies to obtain refrigerators without WPB permission (3-2-42).

L-35...Amendment No. 1—Sets up 1942 program for production of spare parts for medium and heavy trucks, truck trailers and busses. See also P-107 (3-5-42).

L-42...Sets simplified design for low pressure heating boilers (3-7-42).

L-44-a...Orders cessation of radio and radio-phonograph production for civilian use on April 22 (3-7-42).

L-46...Sets procedure for curtailing electric power use in Western New York (2-27-42).

L-50...Sets restrictions on certain practices of telephone companies (3-2-42).

L-54...Restricts delivery of typewriters (3-6-42).

L-57...Restricts sales and manufacture of gas masks and anti-gas devices (3-3-42).

Daily Iron Output Falls to 159,188 Tons

• • • **Coke pig iron** production totaled 4,458,273 net tons in February compared with 4,970,531 tons in the previous month. Output on a daily basis last month decreased slightly to 159,188 tons from 160,340 tons a day in January. The operating rate for the industry in February was 96.4 per cent of capacity, compared with 97.7 per cent in January.

There were 220 furnaces in blast on March 1 producing at the rate of 160,360 net tons a day compared with 217 in blast on Feb. 1 with a production rate of 159,270 tons. Among the furnaces blown in during the month were those of the Columbia Steel Co. and the Globe Iron Co.

Production of Coke Pig Iron and Ferromanganese

	Pig Iron*		Ferro-Mn†	
	1942	1941	1942	1941
January	4,970,531	4,663,695	36,455	35,337
February	4,458,273	4,197,872	42,832	33,627
March	.....	4,704,135	.....	37,808
April	.....	4,334,267	.....	44,341
May	.....	4,599,966	.....	47,256
June	.....	4,553,165	.....	42,582
½ year	.....	27,053,100	.....	240,951
July	.....	4,770,778	.....	47,193
August	.....	4,791,432	.....	52,735
September	.....	4,716,901	.....	46,932
October	.....	4,856,306	.....	55,495
November	.....	4,702,927	.....	47,669
December	.....	5,012,276	.....	48,188
Year	.....	55,903,720	.....	539,163

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1942	Per Cent Capacity	1941	Per Cent Capacity
January	160,340	97.7	150,441	95.5
February	159,188	96.4	149,924	95.2
March	.....	...	151,745	96.9
April	.....	...	144,475	91.8
May	.....	...	148,386	93.8
June	.....	...	151,772	95.9
½ year	.....	...	149,465	94.5
July	.....	...	153,896	97.1
August	.....	...	154,562	97.5
September	.....	...	157,230	98.8
October	.....	...	156,655	98.2
November	.....	...	156,764	97.7
December	.....	...	161,686	101.2
Year	.....	...	153,161	96.6

Merchant Iron Made, Daily Rate

	1942	1941	1940
January	20,085	20,812	16,475
February	22,502	21,254	14,773
March	.....	23,069	11,760
April	.....	20,434	13,656
May	.....	21,235	16,521
June	.....	21,933	13,662
July	.....	21,957	16,619
August	.....	22,578	17,395
September	.....	21,803	17,571
October	.....	23,243	18,694
November	.....	22,690	22,792
December	.....	23,567	19,779

Production by Districts and Coke Furnaces in Blast (In Net Tons)

	February, 1942		January, 1942			March 1, 1942		Feb. 1, 1942	
		Daily % of Capacity*		Daily % of Capacity*	February, 1941	No. in Blast	Operating Rate	No. in Blast	Operating Rate
Eastern	32,910	110.6	39,298	98.1	32,459	2	1,245	2	1,105
Buffalo	288,013	97.0	299,340	91.0	239,396	14	10,285	14	9,255
Philadelphia	434,024	101.3	476,181	100.3	366,755	19	15,500	19	15,360
Ferro. and Spiegel	17,132	107.9	19,196	109.2	16,885	4	610	4	620
Pittsburgh	1,041,478	95.4	1,167,992	96.6	1,001,000	49	37,195	49	37,910
Ferro. and Spiegel	26,739	59.8	27,476	55.4	25,297	3	955	3	885
South Ohio River	89,973	91.4	100,159	91.9	89,284	7	3,295	7	3,230
Valleys	553,082	104.6	598,620	102.2	520,356	25	19,755	25	19,500
Wheeling	162,493	77.3	242,127	104.0	198,878	10	5,805	10	7,310
Cleveland	337,306	96.9	400,260	98.1	342,942	15	12,755	15	12,070
Chicago	952,913	100.1	1,048,956	98.8	889,577	39	34,035	40	33,835
Ferro. and Spiegel	7,152		.....	...	.....	1	255	0	.....
St. Louis	23,138	73.5	23,719	112.0	.....	1	825	1	765
Detroit	131,273	107.3	139,539	103.0	105,664	5	4,690	5	4,500
Western	53,939	72.7	51,700	62.9	62,069	4	2,195	3	1,425
Southern	296,917	95.1	338,980	198.1	306,242	18	10,605	18	10,935
Ferromanganese	9,791	101.7	1,988	18.1	2,069	4	360	2	65
Total	4,458,273	96.4	4,970,531	97.7	4,197,872	220	160,360	217	159,270

*Revised for capacity as of Jan. 1, 1942.

PERSONALS . . .

• **C. L. Austin** was elected treasurer of the Jones & Laughlin Steel Corp. Mr. Austin succeeds **J. C. Watson** who had been treasurer of the Jones & Laughlin for many years but who has resigned from that position, effective March 18, 1942, when he will round out forty-eight years of continuous service with the Jones & Laughlin interests. Mr. Watson requested that he be relieved from the active duties of treasurer because of continued ill health but he retains his post as a director of the corporation. The board also elected **C. L. Austin** and **W. L. Copeland** directors of the corporation.

• **Ralph R. Newquist** has been named as assistant to Walter Geist, vice-president of the Allis-Chalmers Mfg. Co., Milwaukee. Before assuming his new position, Mr. Newquist had been manager of the Allis-Chalmers Co.'s district office at Houston, Tex. He had previously served in the firm's offices in Chicago, Pittsburgh and Boston. **C. W. Schweers** succeeds Mr. Newquist as manager of the Houston office.

• **John J. Davis, Jr.,** will be in charge of the railroad materials and commercial forgings division at Chicago for Carnegie-Illinois Steel Corp. during the absence of **Orrin H. Baker,** manager of this division, who is serving with the War Production Board in Washington. Mr. Davis is assistant manager of sales of this division.

• **Sidney H. Birdseye,** topographical consultant, has joined The H. K. Ferguson Co., industrial engineers and builders, of Cleveland and New York, as topographical engineer.

• **C. L. Bransford,** who resigned in 1941 after serving for several years as Birmingham district manager for Republic Steel Corp., has been appointed member of a five-man advisory board for the Birmingham Ordnance District. With two members yet to be selected, other members of the board are **Herbert Tutwiler,** president of the Black Creek Coal & Coke Co., and **Gerry Cabaniss,** who was a member of the Birmingham law firm of Cabaniss and Johnston.

C. L. AUSTIN, treasurer, Jones & Laughlin Steel Corp., Pittsburgh.

• **F. H. Stephenson,** formerly an engineer of Stockham Pipe Fittings Co., Birmingham, has been made foundry superintendent of the American Blakeslee Mfg. Co., division of American Casting Co., Birmingham.

R. R. NEWQUIST, assistant to Walter Geist, vice-president, Allis-Chalmers Mfg. Co., Milwaukee.

• **Noble B. Clark,** manager of subcontracting, was recently made assistant sales manager of Warner & Swasey Co., Cleveland. He was foreign sales representative in London before outbreak of the war. He has been with the company for eight years. **Frank J. Pelich,** district manager at Milwaukee, was brought to Cleveland as manager of subcontracting, and **George L. Kluter,** assistant to the vice-president, was made works engineer. Mr. Kluter, who has been with the company for 23 years, started as a tool designer.

• **D. D. Whitcomb,** farm products agent for South Carolina for the Tennessee Coal, Iron & Railroad Co., Birmingham, since 1937, has been appointed farm products marketing agent for the company, succeeding **Samuel F. Teague,** resigned.

• **Richard G. Taylor** has been made assistant to **A. V. Murray,** secretary Scaife Co., Oakmont, Pa. Mr. Taylor was formerly associated with the LaSalle Steel Co. of Chicago in a sales administration position.

• **Dr. R. W. Sandelin,** Atlantic Steel Co., Atlanta, Ga., has been awarded the first Thomas M. Gregory memorial recently established by the American Hot Dip Galvanizers Association, Inc., for outstanding achievements by members of their association. The award was made to Dr. Sandelin on the basis of two papers which he prepared in the past. One was entitled "Galvanizing Characteristics of Different Types of Steel" and the other, "Metallurgical Factors Affecting the Quality of Galvanizing."

• **R. F. Hartenstein,** formerly director of lighting of the Ohio Edison Co., Akron, Ohio, has become associated with the Hygrade Sylvania Corp., Salem, Mass., as a special representative.

• **Harold R. Wegner,** formerly metallurgist with Brown-Lipe-Chapin, division of General Motors, Syracuse, N. Y., has resigned to accept the position of metallurgist and plant superintendent with Syracuse Heat Treating Corp.

• **A. Donald Armitage** has been made president of the J. H. Williams & Co., Buffalo, manufacturers of drop forgings and drop forge tools. He succeeds the late

J. Harvey Williams and will continue as a director with his headquarters in Buffalo rather than in the general sales offices in New York. **Willard C. Kress,** works manager of the local plant, has been elected vice-president in charge of manufacturing. **E. J. Wilcox,** of New York, sales manager of the stock products division, has been named vice-president in charge of stock products sales.

• **Joseph M. Barr** and **James J. Gaffney** have been named assistant general managers of Vought-Sikorsky Aircraft division of United Aircraft Corp., West Hartford, Conn. In addition to assuming the duties of his new office, Mr. Barr will continue as factory manager. A graduate of the University of Pennsylvania, he has been identified with United Aircraft since 1932, when he joined the former Chance Vought Aircraft division as assistant treasurer. He served with this division and the export division of the corporation in various capacities before being appointed factory manager of Vought-Sikorsky Aircraft in 1940.

Mr. Gaffney, who joined the former Chance Vought Aircraft division in 1929, will relinquish the position of assistant treasurer, but in addition to his new duties will continue as division accountant. **Richard T. Horner** has been named assistant treasurer and assistant secretary.

• **George T. Weisbeck** has been elected president of the Niagara Shipbuilding Corp., Buffalo, succeeding K. Bruce MacDonald, who will devote his full time to the presidency of the Buffalo Pressed Steel Co. Mr. Weisbeck has resigned as vice-president and general manager of the Van Buren Products Co.

• **William S. Ford,** president of the management engineering firm of Wm. S. Ford, Inc., Milwaukee, is joining the organization of the Trundle Engineering Co., Cleveland, as vice-president in charge of the Chicago office and operations in the Chicago territory. **S. A. Peck,** Trundle vice-president who has been in charge of the Chicago office, will now make his headquarters in Cleveland and will be active in all phases of the company's operations.

OBITUARY . . .

THE LATE Henry M. Lucas, president, Lucas Machine Tool Co., Cleveland.

• **Henry M. Lucas,** president and founder of Lucas Machine Tool Co., Cleveland, died of a heart ailment March 2. He was 73 years old. Mr. Lucas had worked in the machine tool industry since 1886 when he began as an apprentice with Warner & Swasey Co., for which he later held the position of department foreman. He subsequently was transferred to the engineering department and in 1895 became chief draftsman, installing all the astronomical equipment in the Naval Observatory in Washington. Early in 1900 he left Warner & Swasey and organized the Lucas Machine Tool Co. with his brother the late George C. Lucas and the late Frank Yost as partners. Among his early designs of special machinery are the Lucas horizontal boring, drilling and milling machine. Mr. Lucas was a member of the National Machine Tool Builders Association and served as its president in 1926.

• **Harry W. Griffith,** secretary of Briggs Mfg. Co., vice-president and general manager of the Briggs Commercial and Development Co., and a director of the Detroit Baseball Co., died Feb. 21. He was 66 years old. He was an executive of the Remy Electric Co., Anderson, Ind., before coming to Detroit. He attended Butler and Purdue Universities and was a graduate of Yale.

• **Edward P. Chalfant,** pioneer automotive executive in Detroit, died recently, aged 72 years. He had lived in Detroit for more than 30 years. He was formerly president of the E. H. Thomas Motor Co., vice-president of the National Auto Parts Association, chairman of the board of the Gill Mfg. Co. and president of the Motor and Accessory Manufacturers' Association.

• **James F. Paige,** superintendent of machinery for the Consolidated Steel Co., Orange, Tex., died there Feb. 16. He was born in Nova Scotia 67 years ago. He became a machinery foreman at the Bethlehem Shipbuilding Co., Ltd., Fore River works in 1903; in 1908 represented the Bethlehem Steel Co. in Japan and supervised construction there; in 1911 and 1912 performed similar work in Italy; then returned to Quincy, Mass., where he remained until 1916. The following year he was made general manager of the Port Arthur Shipbuilding Co., and three years later operating manager for the Halifax Shipyards, Halifax, Nova Scotia. In 1934 he returned to the employ of the Fore River plant.

• **Harry A. C. Small,** supervising hull draftsman at the Bethlehem Shipbuilding Co., Fore River, Mass., works, died recently. He was a native of Jacksonville, Fla., and first became associated with shipbuilding at Brunswick, Ga.

• **Jacob Widmeyer,** 79 years old, founder of the Widmeyer Bearing Co., Milwaukee, died Feb. 19 at his home after an illness of several months. At one time Mr. Widmeyer conducted the largest blacksmith shop in the vicinity of Milwaukee. With the advent of the automobile he tore down his shop to provide for a parking lot. His wide contact with motorists prompted him to go into the automobile accessory business, later to concentrate on bearings.

• **Joseph D. McCord,** structural engineer with the Milwaukee Bridge Co., Milwaukee, died at his home on Feb. 20. He was a native of Milwaukee and took his first job with Milwaukee Bridge at the age of 15 years. After 20 years he became a contracting engineer but returned to his present job a year ago. He was 60 years old.

Reed Reorganizes Bureau To Contain 10 More Branches

Washington

• • • **Because** Philip D. Reed, chief of the WPB Bureau of Industry Branches, thinks the creation of more industry branches necessary to operate American industry, he has reorganized his bureau to contain 24 branches instead of the previous 14, and the number may finally reach 100. The reorganization was announced by WPB last Friday, with an outline of the duties of the action and permanent branch chiefs. Permanent branch chiefs will be appointed in the near future to replace those now designated as acting.

Among the branches and their chiefs are:

Automotive, Ernest Kanzler; Rubber and Rubber Products, Arthur Newhall; Textiles, Clothing and Leather Goods, R. R. Guthrie; Consumer Durable Goods, L. C. Upton; Service and Distribution, Office and Service Machinery, Nathaniel G. Burleigh; Special Industrial Machinery, Lewis S. Greenleaf, Jr.; Construction Machinery, A. Stevenson (acting); Air Conditioning and Commercial Refrigeration, J. M. Fernald; Transportation, A. Stevenson; Farm Machinery and Equipment, William R. Tracy; General Industrial Equipment, Charles S. Williams; Safety and Technical Equipment, H. T. Rosenfeld; Plumbing and Heating, W. W. Timmis; Building Materials, John Haynes, and Containers, Douglas Kirk.

Representatives from other divisions and bureaus of the WPB assigned to Mr. Reed's staff are:

Labor Division, Richard A. Lester; Purchasers Division, Houlder Hudgins; Statistics Division, Virgil Reid; Bureau of Industrial Conservation, A. W. Carpenter; Bureau of Priorities, Joseph Tucker, and Executive Office of the Division of Industrial Operations, Eric Kohler.

Conservation of Tin Studied

• • • **A plan to** reduce the amount of tin consumed by collapsible metal tubes and to eliminate the packing of non-essential items in such containers is being studied by WPB's container branch. Wherever possible the branch will require the use of salvaged instead of pure tin.

Weekly Bookings of Construction Steel in Tons

Week Ended →	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941	Year to Date 1942	Year to Date 1941
Fabricated structural steel awards	5,125	18,200	25,000	35,750	241,685	333,775
Fabricated plate awards	2,000	600	1,810	5,100	8,450	31,045
Sheet steel piling awards	0	0	0	475	790	6,115
Reinforcing bar awards	31,000	39,250	9,450	10,200	342,225	103,890
Total letting of Construction Steel	38,125	58,050	36,260	51,525	593,150	475,185

INDUSTRY'S *New* RIGHT HAND

WHAT IT IS... DENISON EQUIPMENT for APPLIED HydrOILics

WHAT IT DOES... Already, engineers here at Denison have adapted oil hydraulics to an amazing variety of operations — some of which were never before done by machinery; others which were done less efficiently by older methods. Today, reaching into almost every industry, it is doing many types of assembling, clamping, loading, lifting, handling, hauling, holding, tilting, testing, pushing, pulling, packing, pressing and so on. The field of HydrOILics is rapidly and constantly expanding . . . its limits have not even been approached.

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WHAT TO DO ABOUT IT... For one thing, when you need hydraulic equipment or parts of any kind, turn to Denison HydrOILics. Secondly, whenever you have an equipment problem or a special requirement that suggests, however remotely, the possibility of a HydrOILic solution, get in touch with our engineers. There are no strings to this invitation. Write for any information you desire!

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MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Government Agencies Competing for Machine Tools

Cleveland

• • • **Despite the pressure for delivery** of certain types of new machine tools, reliable sources inform THE IRON AGE that many vital types of machine tools now remain idle in plants either awaiting war work or unable to secure government orders. There are specific instances where planers, milling machines, drill presses, boring mills, lathes and similar items are idle at various plants in Ohio.

Competition among the Army, Navy and the War Production Board for new machine tools has reached the stage where each of these government units considers it a moral victory to outsmart the other in securing machines for specific plants which they may happen to be aiding. In several instances, this multiple pressure applied upon machine tool producers has resulted in two different plants each receiving a portion of their requirements, but neither being able to operate until they secured the balance. This situation was believed to have laid the groundwork for possible allocations, which originally were planned for March 1, but have been temporarily deferred.

Various defense plants requiring machine tools evidently placed credence in a rumor to the effect that if they did not place their orders for machine tools before April 1, they might not be able to order such equipment after that date. As a result, machine tool manufacturers have received frantic but incomplete instructions from various customers, with the advice that full details of such orders would be sent along later on. This misunderstanding is evidently due to the fact that the Army and Navy Munitions Board recently advised war contractors that they would lose their standing on the new master numerical preference list now in preparation if they did not place their orders for machine tools by April 1. However, the reason for this order by the board is that it feels that there has been unnecessary delay in getting many important high-rated orders for machine tools placed.

Unfilled Orders Mount

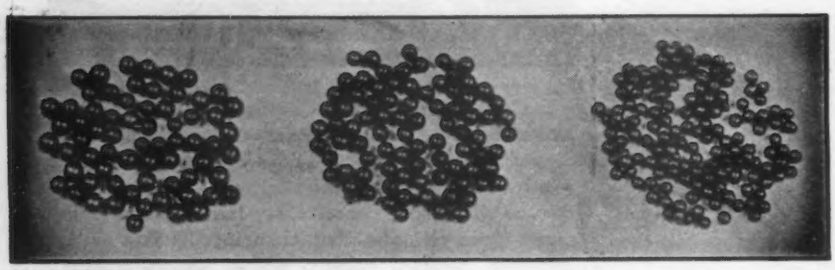
Cincinnati

• • • **With the steadily accelerating** defense program, the pressure on machine tools builders is daily becoming more intense. Unfilled orders and new billings steadily mount, the magnitude of which is illustrated by the annual report of one large machine tool builder which indicated unfilled orders on Jan. 1 to be more than twice as many as in the same period a year ago. During the past week, a number of new contracts for "farming out" business to subcontractors were reported and an unestimated number of additional negotiations are still under way. One company, which made an increase to its plant about a year ago, is now increasing it still further, and other manufacturers in the area are planning other plant expansions.

Hudgins Given Post in WPB Purchases Division

Washington

• • • **Houlder Hudgins,** president of the Sloane-Blabon Corp., New York, manufacturer of linoleum and hard surfaced flooring, has been appointed deputy director of WPB's division of purchases. He succeeds Arthur B. Newhall, now chief of the rubber branch in the division of Industry Operations.



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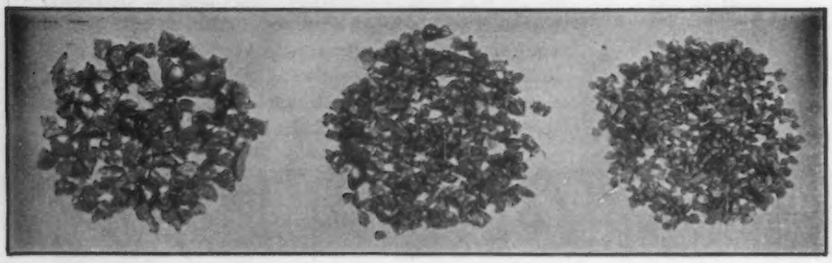

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Premium Price Plan Announced

• • • **The initial plan** for MRC premium payments for over-quota production of specific non-ferrous metals was announced for tri-state area production of lead and zinc concentrates during the past week. MRC will pay producers for over-quota production at the rate of $28.05 a dry short ton for 60 per cent zinc sulphide concentrates, f.o.b. mill bin in the tri-state district and $39.60 a dry short ton for 80 per cent lead concentrates, f.o.b. mill bin, tri-state district. In addition, an adjustment of 5c. for each change of 0.1 per cent will be made for the grade of material produced above or below the 60 per cent concentrate set for zinc, and the 80 per cent concentrate set for lead.

The McColgin ore sales agency, Joplin, Mo., will handle the necessary data required for payments under the MRC plan, and all information concerning a producing area must be sent by the producer to McColgin for transmittal to MRC. This information will include a monthly statement showing, among other things, the name of the producer who has sold excess production, the amount of concentrates delivered and sold during the month for which payment has been or will be made, and the amount of such concentrates which is eligible for the production premium prices.

Zinc production, during February, totaled only 74,774 tons, down from 79,413 tons in January because of the short month. The daily average production of 2624 tons however, is a new record high. Stocks are down to 22,626 tons at the end of February from 23,925 tons at the end of January, while unfilled orders were 109,260 tons against 110,552 tons at the end of January.

The zinc pool for March, supplementary order M-11-1, was somewhat changed this month, as was expected. Producers will set aside for pool allocation amounts equal to: 50 per cent of high grade and special high grade; 40 per cent of all other slab grades; 20 per cent of lead free oxide; 10 per cent of leaded oxide; and none of the zinc dust barred on December production. This compares with a general 40 per cent pool of all slab grades in February.

Attention this week was focused on the House military affairs committee's charge against Donald M. Nelson, the WPB, and the rural electrification administration that vital sources of copper and other scarce war materials are being wasted in the construction of several REA power transmission lines. The lines, it was maintained, duplicate present facilities, and are unnecessary to supply the needs of the new aluminum plants.

In the minority report of the committee, it was charged that the sub-committee that led the investigation had been subjected to "wild and careless statements by the power trust, which the majority report readily accepted as true," and it was urged that the minority reports be read closely.

A conservation move for lead and other non-ferrous metals was made by the WPB's drastic limitation of the practices of the telephone companies in their engineering, betterment and relocation plans. The program calls for an annual saving of 24,400 tons of lead, 29,500 tons of copper, 650 tons of zinc, 540 tons of crude rubber, 29,000 tons of steel, and large amounts of other needed materials.

Average prices of major non-ferrous metals during February are:

	Cents per lb.
Electrolytic Copper, Connecticut Valley	12.00
Lake Copper, Eastern Delivery	12.00
Straits Tin, Spot, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Lead, St. Louis	6.35
Lead, New York	6.50

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SCRAP

. . . MARKET ACTIVITIES AND PRICE TRENDS

Freight Question Due For Settlement Soon; Rise Is March 18

• • • **The scrap industry's** interest centered this week on the new boost in railroad freight rates, effective March 18, which might lead to widespread confusion unless OPA acts promptly.

Unless some provision is made whereby the increased amount of freight can be placed on the invoice to the consumer, the broker or dealer will have to absorb the increase if he is not to be in violation of the present code which has already established the mechanics for delivered prices. Such absorption would tend to dry the already meager flow of material.

Provision probably will be made for passing the freight increase on to the ultimate consumer, in the opinion of dealers, who pointed out that the present scrap order should stand unchanged but should be amended to allow the insertion of the freight rate increase on the invoice to be paid by the consumer. If the scrap order is changed very much untold confusion will result.

Meanwhile, additional evidence appeared pointing to the failure of government allocations of scrap. Ford Motor Co., granted an allocation order for 15,000 tons, found that many of the dealers ordered to fill the order were small suppliers, incapable of handling the quantities desired, or were engaged in some other business. Some had moved or gone out of the scrap trade. All of which was difficult to explain to Ford steel workers who have been working fewer hours per week recently.

A marked change has been noted recently in scrap quality. The gradual drying up of railroad scrap lists, which have all but disappeared, has been forecast for some time. Not only are the carriers forced to continue using old rails and equipment, but such scrap as they do yield is allocated by federal officials. Furthermore, OPA price ceilings make bidding an empty procedure. Another change has followed in the wake of the ban on automotive production. Formerly the auto industry was a major scrap producing source.

For comment on western salvage campaigns, see "West Coast" column in this issue on page 84.

More turnings are coming onto the market than ever before. This trend can be expected to gain headway.

Edwin C. Barringer, secretary of the Institute of Scrap Iron & Steel, Inc., touched on the question of quality in a recent newspaper release, pointing out that bed and baby buggy springs, bedsteads and other articles made of light iron once thrown aside as useless by steel makers will all help keep the steel mills of the country operating at a high rate. One plant in Ohio that formerly used steel rail scrap cut to short lengths started to mix in auto cast iron and miscellaneous steel scrap when the pinch first came months ago, he said, and since than has taken bundled light steel shearings, motor shafts and punchings. Now the company mixes rims, auto parts, and other grades and gets a melt that meets rigid specifications.

The so-called jam on freight cars appeared less serious last week. Statistics available at New York do not indicate a critical situation.

The Senate passed and sent to the President last Thursday a bill suspending tariffs on iron and steel and non-ferrous scrap for the period of the national emergency. The repeal of the tariff provision is expected to attract scrap from oil producing areas of the Caribbean and South America.

OPA Probes Deception By Minority in Scrap Industry

Pittsburgh

• • • **The OPA,** it is understood, is investigating isolated cases of scrap violations as far as quality is concerned which, although amounting to a very small part of the total scrap shipped and indulged in by only a few scrap dealers, do nevertheless reflect on the good work which the scrap industry has been doing.

A substantial number of cars of alleged heavy melting scrap was rejected in Pittsburgh recently by a large steel mill because approximately 60 to 70 per cent of the material under the thin layer of heavy melting steel included tin cans, galvanized buckets, dirt, pit scrap, rags, orange peels, and other garbage. There have also been cases where some dealers

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have put concrete in scrap bundles. The foolish part of such practices, aside from giving the industry a black eye, is the fact that in every case the deception is discovered. Violations of this type are by far in the minority and the amount of scrap involved is an exceptionally small part of the total.

•

PITTSBURGH—Supplies of scrap are no more plentiful here than a week ago and confusion existed early this week as to what should be done regarding increases in freight rates. Some sources believe OPA will instruct brokers to add this increase on to the invoice to the consumer but nothing official was available early this week. At a meeting of the Pittsburgh industrial salvage committee here last week headed by Albion Bindley, vice-president of Pittsburgh Steel Co., more impetus was given to the drive for industrial scrap with emphasis on scrapping of obsolete machinery.

•

PHILADELPHIA—Shortages of freight cars continue to be hampering the scrap movement here. With 400 to 500 tons of scrap ready for shipping, one yard feared it would be accused of hoarding if the material was not moved shortly.

•

DETROIT—Ingot production continues to drag along at 94 per cent because of the scrap shortage at Ford Motor Co. The allocation of 15,000 tons of scrap to Ford several weeks ago produced very little scrap and the company protested to Washington but was told to "get out and rustle for it."

It is reported the allocation lists included names which by no stretch of the imagination could be considered as large suppliers of scrap iron or steel. Remote country auto graveyards were listed in the allocation and were supposed to supply car loads of scrap every month despite the fact in normal times a carload a year, or even less, is their output. Ford itself has investigated each of the allocated sources and finds many have "moved, left no address" and some who report that their business is paper and rags.

Meanwhile, Ford steel workers have been reduced to 32 hours a week and there are mutterings in CIO quarters because these skilled men are getting low weekly wage checks. Unless more scrap is forthcoming Ford sources indicate still more open hearths will be cut off shortly. At present only 6 of the 10 furnaces are operating. Meanwhile, Great Lakes Steel Corp., while it has derived some scrap from allocations, still reports that furnace production is less than normal because of the scrap situation.

•

CHICAGO—One mill managed to get considerable scrap during the past two or three weeks, the result being that others skidded closer to the danger point. This illustrates the status of the scrap market, with just a certain amount available and the consumers bidding against each other. More midwest communities are endeavoring to put over plans to scrap abandoned street car rails. The BIC is aiding cities in clearing up legal tangles which always involve these projects. Champaign, Ill., is the latest to announce a decision to pick up rails, in this case about 25 miles being involved.

•

CLEVELAND—The expected change in the nature of scrap collections is now developing pretty well in the manner that had been foreseen, and includes an increase in turnings and a gain in electric furnace scrap. On the other hand, the decline in rail scrap is expected to grow worse. In recent weeks, the cast scrap situation has been improved by the auto graveyard campaign and the house-to-house collections, which returned fair amounts of this type of scrap. The shortage of burners as reported on these pages March 5 is not regarded as a very serious problem by a scrap dealer who faced this difficulty in the last war. He says burners can be trained within a week, although such training will be rather expensive in the consumption of gas by the trainees. Naturally, this cost factor is one which some dealers hesitate to absorb in view of the fact that the men would probably have finished their work within some 90 days.

•

BIRMINGHAM — The scrap situation here is without any great improvement although consumers are hopeful that allocations, now becoming effective, will provide at least a measure of relief. Inclement weather has been a recent collection obstacle.

•

BOSTON — Exceptionally heavy rains and snows slowed up the movement of materials two days. The government has officially informed shippers that 55c. a ton, the freight to wharf, must be deducted from the selling price at ports outside Boston, which clears up that factor. Shippers report a rapidly increasing shortage of barge space. Barge owners do not want to operate below the port of New York because of submarine activities. Automobile graveyard owners have been given 90 days to dispose of their scrapped cars.

•

BUFFALO—Allocations of scrap from the New England and Michigan districts to the Buffalo area's largest consumer are said to be averting, at least temporarily, a threatened shutdown of additional open hearths there. Meanwhile, reclamation of an estimated 6000 tons of abandoned street-car tracks in Buffalo is being sought by the local salvage committee. Under a proposed plan, the traction company will be asked to give title to the tracks to the city, which in return will seek to salvage the tracks and repave the track areas as a WPA project. The freight car and "burner" situations are satisfactory at present, dealers report.

Highly maneuverable Marschke Swing Grinder "doing business" in a Penna. steel mill. Notice that there is no outboard bearing to obstruct operator's view of workpiece.

MARSCHKE GRINDERS for Extra Long Efficient Service

SIGNIFICANT is the fact that Marschke Grinders which entered service in World War I are working on Defense today. The eighteen features built into Marschkes coax expensive abrasive wheels to remove above average poundage throughout Marschkes' long, dependable life. You can't beat the economy of Marschke Swing Frame and Floor Stand Grinders for all rough grinding operations. Check and compare! Write today for Marschke Catalog.

THE MARSCHKE LINE

Over 70 specifications of Swing Frame Floor Stand and Pedestal Grinders—and Buffers —1 to 25 HP, 10" to 30" wheels.

VONNEGUT MOULDER CORP., 1843 Madison Ave. Indianapolis, Ind.

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BASIC OPEN HEARTH GRADES (Machine Shop Turnings)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES — Low Phos. (Billet, Bloom, Forge Crops)	Low Phos. (Bar Crops and Smaller)	Low Phos. (Punchings and Plate)	Heavy Structural and Plate (3 ft. and Unde.)	Heavy Structural and Plate (2 ft. and Under)	Heavy Structural and Plate (1 ft. and Under)	Cut Auto. Steel Scrap (3 ft. and Under)	Cut Auto. Steel Scrap (2 ft. and Under)	Cut Auto. Steel Scrap (1 ft. and Under)	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

Bundles with less than 50% tin coated material are $5 per gross ton below basic open hearth grades; those with more than 50% tin coated material are $8 below basic open hearth grades.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use in explosive making) add $5 to price of cast iron borings; for chemical use outside explosives making, add $3.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: states not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	**40.00**	**40.00**	**40.00**	**40.00**
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	20.00
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.75
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh	22.00	22.00	22.00	22.75
No. 1 cast, Philadelphia	24.00	24.00	24.00	24.50
No. 1 cast, Ch'go*	21.00	21.00	21.00	20.75

*Changed to gross ton basis April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941
Furnace coke, prompt	$6.00	$6.00	$6.00	$5.50
Foundry coke, prompt	6.875	6.875	6.875	5.75

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Mar. 10, 1942	Mar. 3, 1942	Feb. 10, 1942	Mar. 11, 1941
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	51.875
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.60
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 148 to 156 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
March 10, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.45 a Gross Ton	$20.33 a Gross Ton

	High	Low	High	Low	High	Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

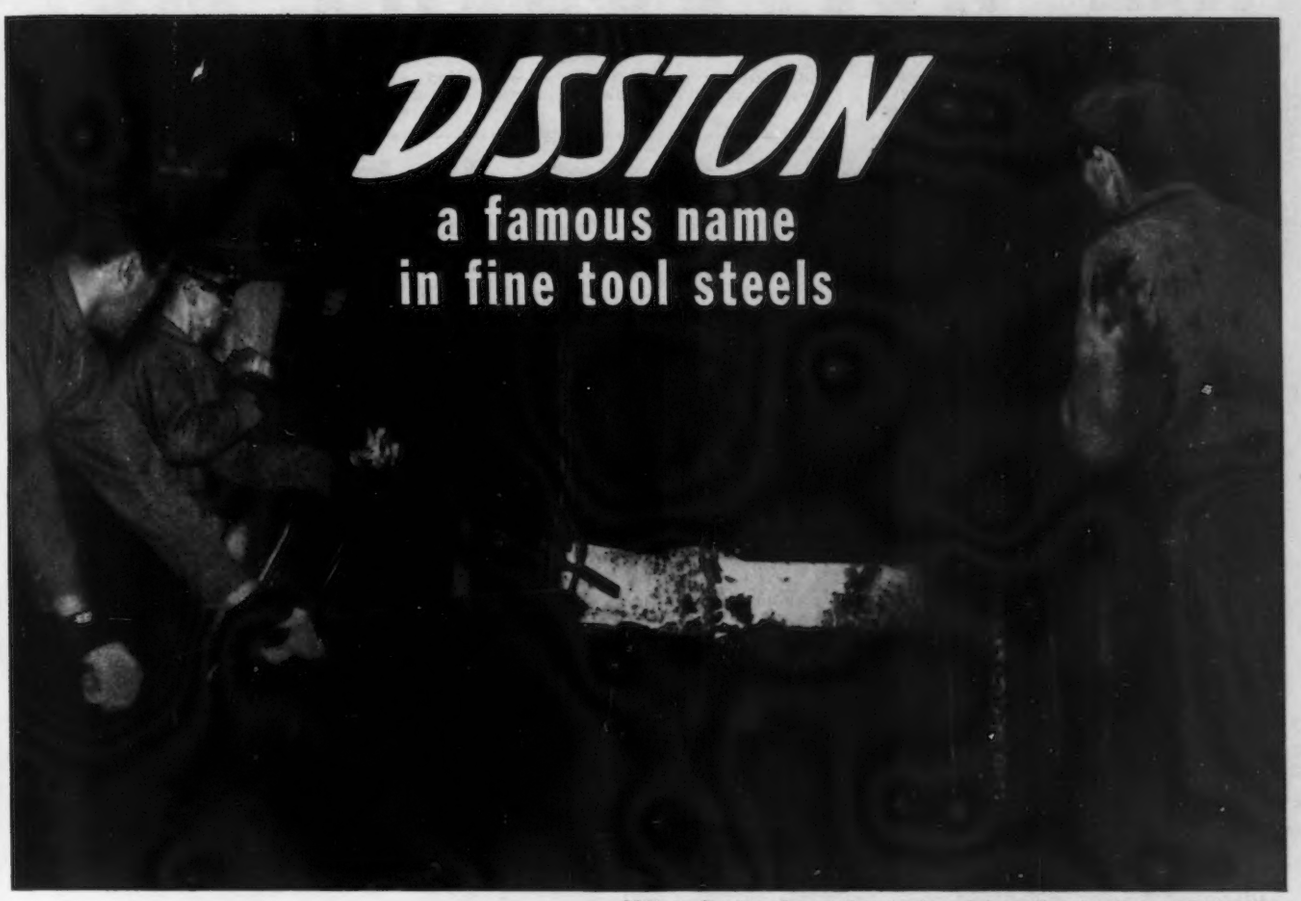
Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢					2.80¢	(Worcester =3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ([10])			3.37¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
								(Coatesville and Claymont =2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢([11])		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributors. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ** Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.



All Disston ingots are hammer forged under a six-ton or three-ton steam cogging hammer.

Eighty-seven years of fine steel manufacture have created a background of experience, a tradition of quality, that are expressed today in superior Disston Tool Steels for many purposes.

In modern electric furnaces Disston uses only the purest materials and carefully segregated scrap, selected by expert metallurgists. Ingots are cast from shallow ladles into the smallest size mold that will give ideal reduction to finished rolled size.

Since accurate metallurgical and chemical controls permit operations within very close limits, many desirable special properties are developed in Disston Steels. Grain size can be predetermined and soundness and cleanliness maintained at extraordinary high levels. Thus it has been possible for Disston to produce such important tool steels as Croloy . . . highly resistant to both sliding and impinging wear, with good air hardening qualities . . . a superior tool steel for dies, punches and many high production tools.

At the service of the men who make tools: Disston engineers and metallurgists are always at your service for advice and assistance in the selection of the best tool steel for the job to be done. They will help you get more "mileage" per tool . . . And if you do not have a copy of the illustrated 73-page catalog "Disston Tool Steels," write for your copy today to Henry Disston & Sons, Inc., 319 Tacony, Philadelphia, Pa., U. S. A.

CONSERVATION • SERVES EVERYONE •

CROLOY thoroughly *proved* ..in actual practice

Croloy, produced under U. S. Patent 1,695,916, is a chromium-vanadium-molybdenum alloy steel which has won its laurels in many long, difficult production runs right in the Disston plant and in many other important industries . . . in such applications as punches, dies, swaging mandrels, gauges, shear blades, wearing parts, slitting cutters and planer knives. The vanadium content of Croloy is an important factor in producing its high resistance to both impinging and sliding wear and its ready air hardening property.

HENRY DISSTON & SONS, INC.
319 Tacony, Philadelphia, Pa.

I don't have a copy of your catalog, "Disston Tool Steels." Please send me one, without obligation, today.

Name----------

Title----------

Firm----------

Address----------

DISSTON TOOL STEELS

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal	
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....	
Brooklyn	27.50	.....	.....	28.00	.....	.....	
Jersey City	26.53	26.03	27.53	27.03	.....	.....	
Philadelphia	25.84	25.34	26.84	26.34	.....	.....	
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....	
Everett, Mass.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....	
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....	
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....	
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....	
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....	
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....	
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....	
Cincinnati	24.44	24.61	.....	25.11	.....	.....	
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....	
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....	
St. Louis	24.50	24.02	.....	.....	.....	.....	
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....	
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**	
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**	
St. Paul	26.63	.....	27.13	26.63	.....	.....	
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....	
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....	
Los Angeles	27.50	.....	.....	.....	.....	.....	
San Francisco	27.50	.....	.....	.....	.....	.....	
Seattle	27.50	.....	.....	.....	.....	.....	
Provo, Utah	**22.00**	.....	.....	.....	.....	.....	
Montreal	27.50	27.50	.....	28.00	.....	.....	
Toronto	25.50	25.50	.....	26.00	.....	.....	

GRAY FORGE IRON

Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. E. & G. Brooke Iron Co., Birdsboro, Pa., is permitted to charge $1 in excess of maximums specified in Price Schedule No. 10.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

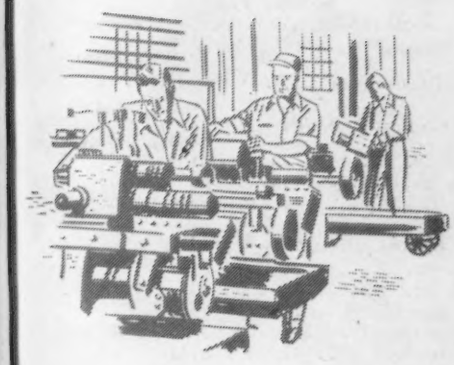
WAREHOUSE PRICES

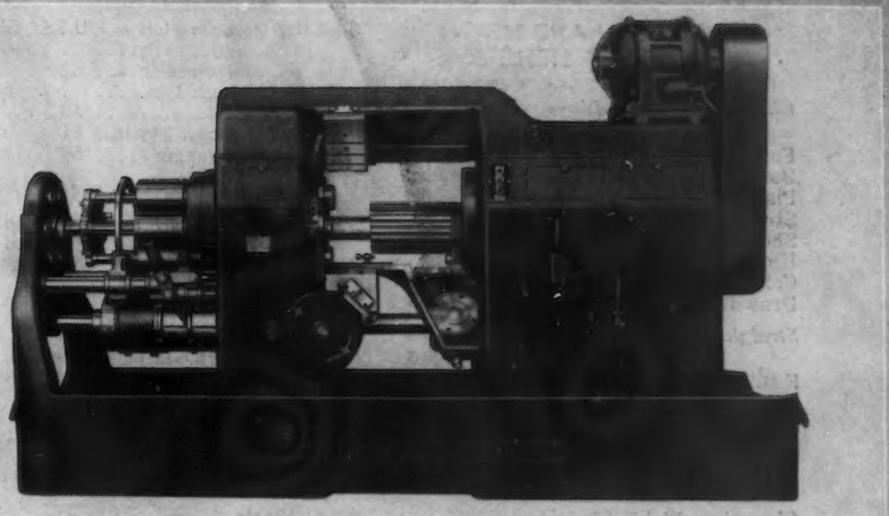
(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.65
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

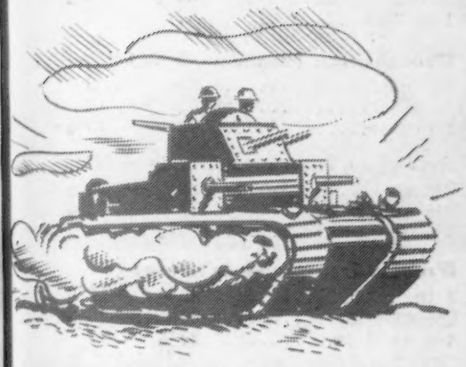
BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43.

FROM PRODUCTION LINE





TO FIRING LINE



Ohio Seamless Tubing serves on BOTH FRONTS

This is a war of strength, speed, precision — from start to finish. That's why you'll find Ohio Seamless Tubing in action all the way — from production in the factories to offensives in the field.

Ohio Quality Tubing is used for many machine parts that require high load-bearing and fatigue strength, precise machining . . . like the collets, pushers, spindles in the machine shown above. Uniform workability, accuracy to size and gauge, bright, non-oxidized surfaces both inside and out — these qualities of Ohio Seamless Tubing help to speed production. When finished units go into action, the inherent structural strength and close tolerance in parts made from Ohio Tubing contribute to fast, steady production of precisely machined parts. Many of these, too, are made from Ohio Tubing — precision bearings for multi-ton tanks, shell parts of exacting strength, accuracy, smoothness for air, land and sea projectiles . . . other military essentials.

Today's emphasis on strength, speed and precision reflected in the increased demand for Ohio Seamless Tubing in war industries, indicates how well it will meet your peacetime requirements.

ACME GRIDLEY
MULTIPLE SPINDLE
AUTOMATIC
Helps speed mass production of hundreds of essential war products cut from metal bars or tubing . . . shell castings and other bullet parts, precision parts for armored trucks, tanks, depth charge bombs, many others. Ohio Seamless Tubing is used in the manufacturing of this machine . . . in many products it produces.

THE **OHIO** SHELBY, OHIO **SEAMLESS TUBE COMPANY**

OHIO SPECIAL QUALITY

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

* Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

* In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅛ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk....80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ....65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

* 15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

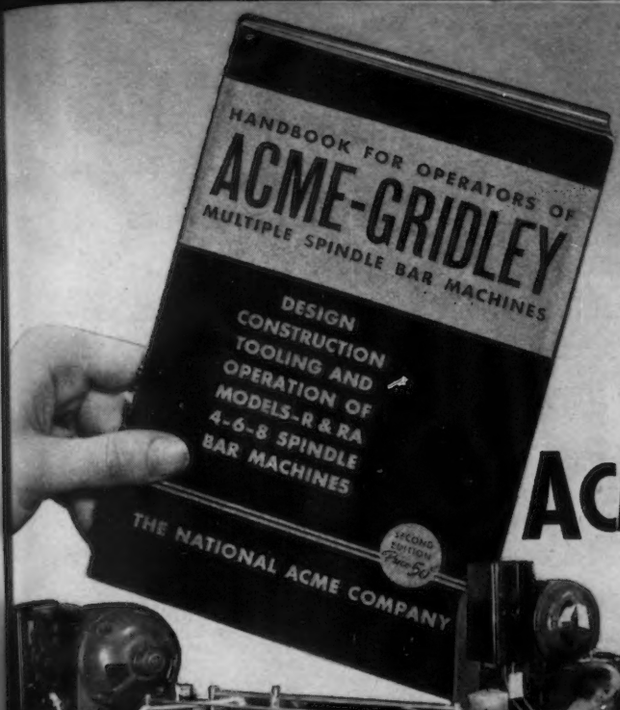
Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

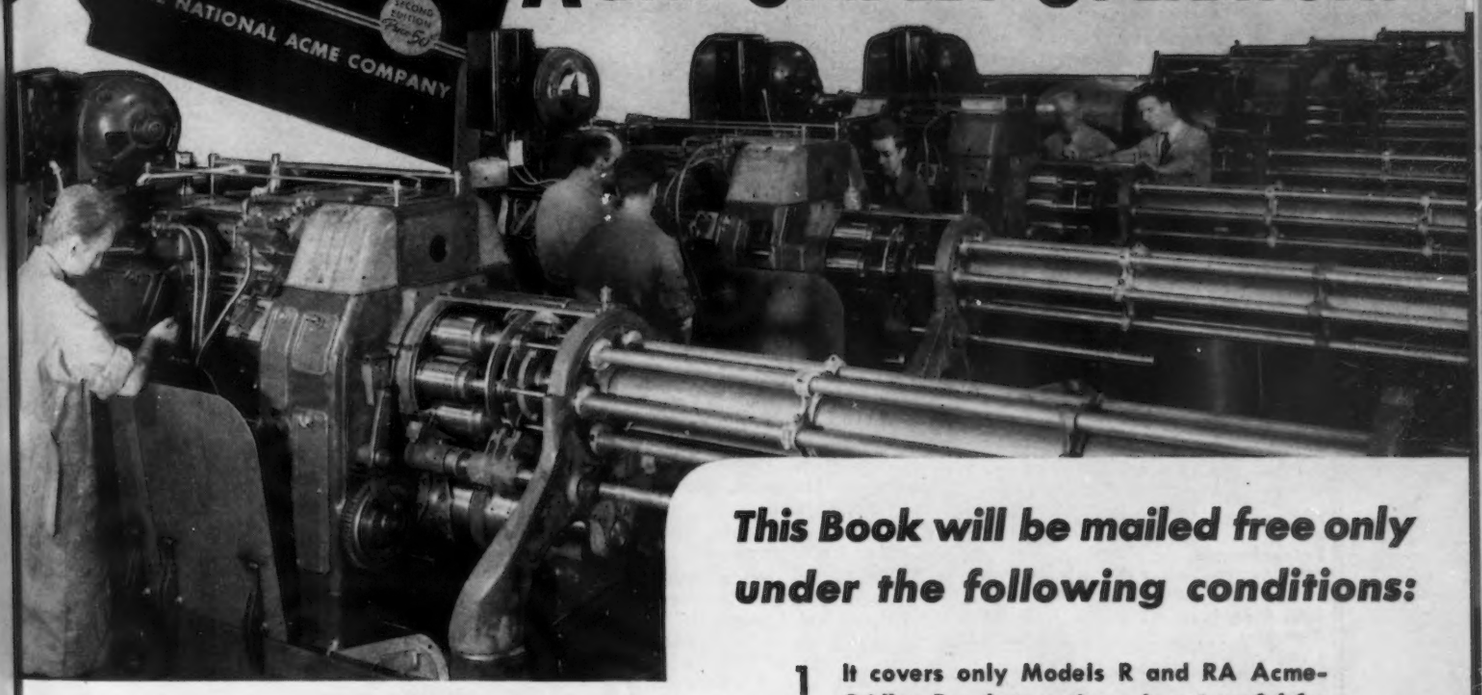
Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



HERE'S *Help* FOR THE NEW ARMY OF ACME-GRIDLEY OPERATORS



Every month greater numbers of Model RA Acme-Gridleys are rushed to plants where hundreds of new operators are being trained for the faster and better production of parts for shells, guns, tanks and planes.

To this army of Acme-Gridley operators behind the fighting lines this valuable Operators Hand Book is free. Its 124 pages with over 100 illustrations were prepared by our own operators — men who know Acme-Gridley from A to Z.

This Book will be mailed free only under the following conditions:

1. It covers only Models R and RA Acme-Gridley Bar Automatics — is not useful for earlier models (A, C, F, G, H machines) for which no books are left.
2. Give Company name, model and size of machine on which you are actually working, such as R1-1/4", RA1-5/8".
3. If our records show that you have already received a copy, another will not be sent.
4. If you are not a foreman, operator or assistant, but merely interested in this book, send 50c (a fraction of its cost) with your letter. Such orders are not encouraged.
5. Due to the reasonably limited supply of this book we are obliged to adhere strictly to the above conditions.

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $36.00
Domestic, 26 to 28% 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk) $74.50
50% (ton lots, packed) 87.00
75% (carload lots, bulk) 135.00
75% (ton lots, packed) 151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio $29.50*
Buffalo 30.75*

For each addition 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon .....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload....$ 2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50.... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn. .....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn. .....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail $25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.. .....$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00